Hazard Mitigation Plan

Pulaski County, Arkansas

INCLUDING:

- Pulaski County – Unincorporated
- Cammack Village
- Jacksonville
- Little Rock
- Maumelle
- North Little Rock
- Sherwood
- Wrightsville
- Pul Co Special SD
- Little Rock SD
- Jacksonville/North Pulaski SD
- School for the Blind
- School for the Deaf

Approved January 19, 2021

Developed by:

Central Arkansas Planning
and Development District

Contents

Sample Adoption Resolution

County, Participating Jurisdictions and School Districts

RESOLUTION #

A RESOLUTION ADOPTING THE PULASKI COUNTY HAZARD MITIGATION PLAN FOR THE CITY/COUNTY/SCHOOL DISTRICT PULASKI COUNTY ARKANSAS.

WHEREAS, certain areas of Pulaski County are subject to periodic flooding and other natural and man-caused hazards with the potential to cause damages to people's properties with the area; and

WHEREAS, the City/County/School District desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) required that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, to assist cities and counties in meeting the requirements, Pulaski County, with the assistance of Central Arkansas Planning and Development District, has initiated development of County wide multi-jurisdiction Hazard Mitigation Plan the County and all jurisdictions in the County, specifically the cities and school districts;

NOW, THEREFORE, BE IT RESOLVED BY THE City/Quorum/Board of City/County/School District.

That the City/County/School District, Arkansas adopts those portions of the Plan relating to and protecting its jurisdictional area against all hazards (date) and

Appoints the Emergency Management Director to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the Hazard Mitigation Plan be developed and presented to the governing board for consideration; and

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

APPROVED and ADOPTED on this _____ day of _____, 2020

APPROVED:

_____

Mayor/Judge/Superintendent

ATTEST:

_____

Secretary

SECTION 1: Planning Process

1.1 Plan Introduction

1.1.1 Disaster Mitigation Act of 2000

The purpose of the Pulaski County Hazard Mitigation Plan is to provide guidance for hazard mitigation activities in Pulaski County. The Pulaski County Office of Emergency Management has the responsibility to coordinate all local activities relating to hazard evaluation and mitigation, and to prepare and submit to FEMA a Local Mitigation Plan following the criteria established in 44 CFR 201.4 and Section 322 of the Disaster Mitigation Act of 2000 (Public Law 106-390). The Disaster Mitigation Act of 2000 became law on October 30, 2000, and amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act ("Stafford Act") (Public Law 93-288, as amended). Regulations for this activity can be found in Title 44 of the Code of Federal Regulations Part 206, Subpart M.

This plan meets requirements for a local mitigation plan under Final Rule 44 CFR 201.4, published in the Federal Register by the Federal Emergency Management Agency (FEMA) on February 28, 2002. Meeting the requirements of the regulations cited above keeps Pulaski County qualified to obtain all disaster assistance including hazard mitigation grants available through the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended.

Pulaski County has three Emergency Management Offices (Pulaski County, City of Little Rock and City of North Little Rock). The three entities takes turns applying for grants for the Mitigation Plan Update. This time the City of Little Rock in Pulaski County initiated the Hazard Mitigation planning process by securing a FEMA Hazard Mitigation Grant Program (HMGP) grant to complete the update. City of Little Rock hired Central Arkansas Planning and Development District, Inc. (CAPDD) to author the plan. The City of Little Rock and CAPDD worked together to engage the county, cities, communities and school districts in the planning process.

The Pulaski County Hazard Mitigation Plan is being developed to assess the ongoing natural hazard mitigation activities in Pulaski County, to evaluate additional mitigation measures that should be undertaken, and to outline a strategy for implementation of mitigation projects. This plan is multi-jurisdictional with a planning area that includes all of unincorporated Pulaski County and the municipalities within the County including the Cities of Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood and Wrightsville. This plan also includes the School Districts of Jacksonville-North Pulaski, Little Rock, North Little Rock, Pulaski County Special, Arkansas School for the Blind and Arkansas School for the Deaf.

Formal adoption and implementation of a hazard mitigation plan presents many benefits to Pulaski County and its residents. By identifying problems and possible solutions in advance of a disaster, Pulaski County, participating communities and school districts will be in a better position to obtain pre- and post-disaster funding. Specifically, the Disaster Mitigation Act of 2000 establishes a non-disaster hazard mitigation grant programs like the Pre-Disaster Mitigation (PDM) grant program and the Flood Mitigation Assistance (FMA) grant program, and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). It requires that states and communities have a FEMA approved hazard mitigation plan in place prior to receiving post-disaster HMGP funds. Pulaski County and participating communities will also gain additional credit points under FEMA's Community Rating System (CRS) program, which provides discounts on National Flood Insurance Program (NFIP) flood insurance premiums for residents of communities that voluntarily participate in this program. Most importantly, Pulaski County will be able to recover faster and more wisely from a disaster. Through planning and acting on local mitigation strategies, the communities will reduce vulnerability to disasters and identify opportunities for mitigation. In addition, the communities may meet comprehensive planning and other planning requirements and achieve community goals. The priorities of the 2020 Pulaski County Hazard Mitigation Plan remain consistent with the 2014 FEMA approved Pulaski County Hazard Mitigation Plan. The priorities of the county have not changed.

1.1.2 Parts of the Plan

The Pulaski County Hazard Mitigation Plan is divided into sections to address FEMA requirements for a local multi-jurisdictional plan. These sections are;

1. Planning Process
2. Planning Area and Resources
3. Hazard Identification and Risk Assessment
4. Mitigation Strategy
5. Acronyms
6. Plan Adoption
7. Appendix

This plan is multi-jurisdictional with a planning area that includes all of unincorporated Pulaski County and the municipalities within the County including the Cities of Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood and Wrightsville. This plan also includes the School Districts of Jacksonville-North Pulaski, Little Rock, North Little Rock, Pulaski County Special, Arkansas School for the Blind and Arkansas School for the Deaf.

All jurisdictions and school districts listed above actively participated in the planning process from its inception. Each jurisdiction provided a representative to participate on the "Hazard Mitigation Planning Team" (HMPT) or if a representative was unable to attend, they chose to be represented by the Pulaski County Office of Emergency Management. HMPT members actively participated in meetings, provided data, solicited input from members of their communities, and ensured that all jurisdiction information was reflected in the plan.

1.1.3 Involvement of Local Governments

Pulaski County's mitigation planning process was initiated on March 7, 2016, when the City of Little Rock was awarded a Hazard Mitigation Grant Program (HMGP) grant by FEMA through the Arkansas Department of Emergency Management, under Matt Burks, Emergency Management Administrator for the City of Little Rock. City of Little Rock negotiated a contract with the Central Arkansas Planning and Development District to facilitate their mitigation planning efforts. Central Arkansas Planning and Development District served as facilitator and City of Little Rock EM Administrator, Matt Burks, led the planning effort.

Once all participating cities and school districts for which the Pulaski County OEM is responsible formally agreed to participate, an initial HMPT composed of representatives from Pulaski County and participating jurisdiction was organized. This initial team was instructed to solicit interested persons from their community to participate on the HMPT. This solicitation led to the addition of several HMPT members. The HMPT members include representatives from County government, local city governments, public works officials, emergency management officials, local floodplain managers, fire districts and school districts. All participating jurisdictions actively participated in the planning process through soliciting input from their communities and participation in meetings. If a participant could not attend a meeting, all minutes and materials were mailed out to the jurisdiction. The Pulaski County Mitigation Hazard Mitigation Planning Team also discussed mitigation actions, projects, and past hazard occurrences with CAPDD during conference calls and one-on-one calls and meetings.

Two planning events were scheduled throughout the planning process. Training events began the planning process. The Central Arkansas Planning and Development District also utilized technical assistance provided by the Arkansas Department of Emergency Management by receiving training at workshops provided by ADEM and FEMA. Technical assistance regarding NFIP was provided by the Arkansas Natural Resources Commission. Technical Assistance regarding the Firewise Program was provided by the Arkansas Forestry Commission. Guidelines for the mitigation plan were discussed as well as training for entering data and how to locate and research the data needed for the mitigation plan. It was stressed to have public involvement and to work together with cities, schools, and County.

Natural Hazard Mitigation Questionnaires were distributed in hard copy by the HMPT members, posted on various websites and available for online completion.

In summary, the planning process consisted of the following items:

- County appointed a Hazard Mitigation Planning Team (HMPT) consisting of mayors and city personnel, school personnel, local floodplain managers, fire department members, emergency workers, planning and development district employees, and LEPC/Citizens Corp Members.
- County engaged the Central Arkansas Planning and Development District (CAPDD), the regional planning organization, to provide staff support in conducting the planning process and preparing the plan.
- Meetings were held with HMPT to understand and agree on planning processes and steps required, including organizing resources, assessing hazards, developing a mitigation plan, and implementing the plan and monitoring progress.
- Central Arkansas Planning and Development District staff attended workshops presented by FEMA and ADEM on the preparation of the mitigation plan.
- Central Arkansas Planning and Development District staff also had numerous subsequent discussions about the planning process with ADEM staff. The CAPDD staff also discussed planning process issues with others in the state that were involved in the preparation of other hazard mitigation plans such as other Planning and Development Districts.
- The Pulaski County OEM reached out directly via email to the OEMs of the surrounding Counties of Faulkner, Lonoke and Saline inviting their participation and providing a draft of the plan for review.

- Public Notices including an invitation to the next HMPT Meeting and a link to an online survey for public, business, academia and other private and non-profit interests was published in the Arkansas Democrat Gazette Newspaper. The notice was also published on websites for some of the participating jurisdictions.

The Planning Committee utilized these technical documents:

- Arkansas Hazard Mitigation Plan was used as a guidance tool for past occurrences and risk assessments.
- Local Floodplain Ordinances for each NFIP Participating jurisdiction to maintain compliance, especially for mitigation actions.
- The Pulaski County Emergency Operations Plan was used to better understand how Pulaski County responds to emergencies and disasters while providing for the safety and welfare of its citizens. Plan provided information about critical facilities in the County.
- 2014 Pulaski County Hazard Mitigation Plan
- FEMA Local Mitigation Planning Handbook (March 2013)
- FEMA G318 Local Mitigation Planning Workshop Student Manual (May 2013)
- FEMA Local Mitigation Plan Review Guide (October 1, 2011)

Timeline:

1. A FEMA Pre-Disaster Mitigation Planning Grant was awarded on February 14, 2019.

2. Contract between City of Little Rock and CAPDD executed on April 9, 2019.

3. Memorandum of Understanding was signed between Pulaski County and the Arkansas Department of Emergency Management on May 8, 2018.

4. First organized planning meeting was held May 22, 2019 at the Little Rock Fire Training Facility in Little Rock, AR. Each person in attendance received a workbook containing a copy of the PowerPoint, a HMPT Survey and Community Surveys to distribute to the community. The PowerPoint including an overview of the planning process was presented, and then the floor was opened for discussion and a questions and answer session. Pulaski County Hazard Mitigation Questionnaires were handed out and participants were asked to forward this information to co-workers and the public.

5. Second Meeting was held October 8, 2019 at the Jacksonville Community Center in Jacksonville, AR - A PowerPoint addressing Task 5- Risk Assessment and Critical Facilities, Task 6 Develop a Mitigation Strategy and Task 7 Keep Plan Updated was covered. Jurisdictions were given critical facility map from the previous plan along with materials to make and changes/updates. Information on risk assessment development, risks and impacts, the location areas, extent of the magnitude and discussion of probably of future events and identifying the community assets. Mitigation Goals, Mitigation Action, and Action Plan were also discussed. Each jurisdiction was given a copy of the previous version of the mitigation action table and provided input regarding the status of those actions. The HMPT also developed their new mitigation actions at this meeting.

6. A final draft of the Plan was provided to the HMPT for review before official FEMA approval or adoption as an opportunity to provide even more input to affect the plan's content.

Meeting Materials are available upon request from Central Arkansas Planning and Development District.

1.1.4 Neighboring Community Involvement

During the Mitigation Planning Process for Pulaski County, neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development were informed of the meetings and invited personally by Little Rock Emergency Management Administrator to attend planning meetings. Lacye Blake and Jennifer Oakley from the Arkansas Dept. of Emergency Management was involved as the State's point of contact. Local Emergency Managers, Police Officer, Firemen and several other first responders were involved during the planning process. The PCOEM contacted surrounding counties to invite them to participate in the planning process by attending meetings and to fill out the Questionnaire.

1.1.5 Public Involvement

During the development of the plan update, the HMPT was provided a three page survey titled "Pulaski County Natural Hazards Questionnaire" to distribute to the community, businesses, non-profits and neighboring communities for input. In addition, a Public Notice was posted in the Arkansas Democrat-Gazette (a daily state-wide newspaper), the Central Arkansas Planning & Development, City of Little Rock and Pulaski County Facebook page and the Central Arkansas Planning and Development District website. Notices were provided to all the attendees and potential participants at the first meeting and were asked to distribute to citizens, businesses, neighboring communities, Community Organizations and Non-Profits. The notice provided a link for people to complete the survey on the web, a link to the original Pulaski County Hazard Mitigation Plan, and invited citizens to attend the October 8, 2019 HMPT meeting. The notice also gave contact information for questions or more information.

A total of 6 responses were returned. The natural hazards that concerned the general public were drought, floods, tornadoes, thunderstorm winds, lightning and hail, and winter storms. The information from these questionnaires was given to the planning members, and mitigation actions were developed from these natural hazards.

After the completion of the planning meetings, the draft plan was provided on the Central Arkansas Planning and Development District (CAPDD) website http://www.capdd.org/index.php/fema-hazard-mitigation-plans.html for any additional input from surrounding communities, the public, businesses, state and local agencies, and anyone else wishing to review.

Planning members were made aware of the requirement that the Pulaski County Hazard Mitigation Plan must be submitted to the Arkansas Department of Emergency Management for review prior to the State submitting plans to FEMA.

1.1.6 Plan Developers

Pulaski County Hazard Mitigation Planning Team-

Jurisdiction	Participation/Involvement
Pulaski County, unincorporated areas and state agencies	County Judge's Office; Judge Barry Hyde, Tony Kelley Pul Co Road & Bridge, County Judge, Pulaski County OEM staff: Andy Traffanstedt, Catherine Arnold and Danny Akins *County Judge and staff received hazard mitigation workbook, attended planning meetings, completed questionnaires, participated in collection of historical natural disaster information and provided input for the Risk Assessment. Personnel of PCOEM received hazard mitigation workbook, attended planning meetings, completed and distributed hazard questionnaires, participated in collection of historical natural disasters information. Participated in phone calls, emails, and other correspondence with facilitator and school districts, cities, and fire departments. PCOEM also handles floodplain management for all of unincorporated Pulaski County and provides technical assistance regarding floodplain issues to all other areas of the County.* Arkansas Department of Emergency Management; Jennifer Oakley *Addressed questions from HMPT about hazard mitigation. Provided Technical Assistance to CAPDD and Pulaski County as needed.* Arkansas Natural Resources Commission; Whit Montague & Veronica Villalobos-Pogue *Provided Technical Assistance to CAPDD and Pulaski County as needed, especially related to Floodplain and NFIP.*
City of Jacksonville	Mayor Bob Johnson, Jim Oakley, Melissa Griggs FPM, and Fire Department Representatives Allan Laughy, Danny Atkins, Melissa Griggs *City staff attended planning meetings, received hazard mitigation workbooks, completed questionnaires assisted with Risk Assessment, and participated in open discussion of historical storm events.*
City of Little Rock	Assistant Mayor, Bruce Moore, Matt Burks Director of OEM, Nathan Spicer, Dana Carney, Nathan Charles and Police Department Representatives Harry Moore and Jeff Plunkett *City of Little Rock was our grantee for the Mitigation Plan. They coordinated with CAPDD with all planning and public participation events. They attended planning meetings, completed community capabilities assessment and natural hazard questionnaire, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.*
City of Maumelle	Mayor Caleb Norris, Jim Narey Director of Planning, Jack Stowe Director of Special Projects and Mike Hogan, Scott Grummer Assistant to the Mayor *City staff attended planning meetings, received hazard mitigation workbooks, completed questionnaires assisted with Risk Assessment, and participated in open discussion of historical storm events.*
City of North Little Rock	Mayor Joe Smith, Leonard Montgomery OEM, Cassidy Ezzi, Charley Baxter, Chief Danny Bradley *Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.*
City of Sherwood	Mayor Virginia Young, Tracy Sims OEM, Richard Penn Engineer & Brian Galloway *Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.*

City of Wrightsville	Mayor Terry Mizer, Dennis Hansberry *Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.*
Jacksonville – North Pulaski School District	Chris Oldham *Attended planning meetings, received hazard mitigation workbook, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.*
Little Rock School District	Supt. Ron Self & Kevin Yarberry *Attended planning meetings, received hazard mitigation workbook, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.*
North Little Rock School District	Supt. Kelly Rodgers *Attended planning meetings, received hazard mitigation workbook, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.*
Pulaski County Special School District	Supt. Charles McNulty *Attended planning meetings, received hazard mitigation workbook, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.*
Arkansas School for the Blind	Supt. James Caton *Attended planning meetings, received hazard mitigation workbook, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.*
Arkansas School for the Deaf	Supt. Dr. Janet Dickinson & Ty Mathis *Attended planning meetings, received hazard mitigation workbook, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.*
Central Arkansas Planning and Development District	Leigh Ann Pool, CFM, *Director of SWM and facilitator for the Pulaski County Hazard Mitigation Planning process.* Conya Spencer and Tanya Childers

Point of Contacts

County Judge Barry Hyde Pulaski County Pulaski County Courthouse 201 S. Broadway, Suite 400 Little Rock, AR 72201 501-340-8305 bhyde@pulaskicounty.net	Mayor Bob Johnson City of Jacksonville P. O. Box 126 Jacksonville, AR 72078 501-982-3146 bjohnson@cityofjacksonville.net	Mayor Frank Scott, Jr City of Little Rock City Hall, Room 203 500 W. Markham Little Rock, AR 72201 501-371-4510 mayor@littlerock.gov
Mayor Caleb Norris City of Maumelle 550 Edgewood Sr., Suite 590 Maumelle, AR 72112 501-851-2500 calebnorris@maumelle.org	Mayor Joe Smith City of North Little Rock P. O. Box 5757 North Little Rock, AR 72119 501-975-8601 mayor@nlr.ar.gov	Mayor Verginia Young City of Sherwood P. O. Box 6256 Sherwood, AR 72120 501-835-6620 vyoung@cityofsherwood.net
Mayor Terry Mizer City of Wrightsville P. O. Box 237 Wrightsville, AR 72183 501-455-2585 terrymizer@gmail.com	Director of OEM Andy Taffansteat Pulaski County OEM 3200 Brown Street Little Rock, AR 72204 atraffanstanst@pulaskicounty.net	Superintendent Chris Oldham Jacksonville – North Pulaski School District 1414W. Main St. Jacksonville, AR 72076 501-920-3371
Superintendent Michael Pore Little Rock School District 801 W. Markham Little Rock , AR 72201 501-447-1000	Superintendent Kelly Rodgers North Little Rock School Dist. 2700 North Poplar Street North Little Rock, AR 72114 501-771-8000	Superintendent Charles McNulty Pulaski Co. Special School Dist. 925 East Dixon Road, Little Rock, AR 72206 501-234-2001
Superindentant James Caton Arkansas School for the Blind 2600 W. Markham Street Little Rock, AR 72205 501-296-1810	Superintendent Janet Dickenson Arkansas School for the Deaf 2400 W. Markham St Little Rock, AR 72205 501-324-9514	

1.2 Plan Maintenance Process

1.2.1 Monitoring, Evaluation and Updating the Plan

Although FEMA regulations require a plan update within five years, the City of Little Rock and the Pulaski County LEPC has developed a method to ensure that monitoring, evaluation, and updating of the Pulaski County Hazard Mitigation Plan occurs annually or as needed. The plan will be submitted to FEMA within five-years for review. The Pulaski County Local Emergency Planning Committee (LEPC) will form a Hazard Mitigation Plan Evaluation Sub-Committee of the existing (LEPC). The LEPC consists of members from fire service, health officials, emergency management, law enforcement, community groups, transportation, hospital personnel, school administration and emergency medical personnel, elected officials, and owners and operators of covered facilities. The City of Little Rock Emergency Management Administrator will be the initial Chair of the sub-committee or HMPT Leader. The HMPT Leader will contact the HMPT committee, set up meeting dates, and ensure that each community will maintain a representative on the team.

The Planning Committee will monitor the Plan throughout the 5 year cycle, and make every attempt to ensure the public will be able to directly comment on, and provide feedback about the Plan by posting the agenda and submitting meeting notice to the local media through newspaper articles, County website and postings in public locations. This process will inform the County citizens on any changes or revisions of the Pulaski County Hazard Mitigation Plan. Monitoring the plan as a whole will include projects/actions progress, as well as the relevance and feasibility of completing those not completed, capabilities changes, new risks, or lack of currently identified risks, new hazard data, etc. The Planning Committee will evaluate the method to move forward with proposed actions, re-evaluate and prioritize proposed actions and continue to incorporate the Plan into other planning documents/mechanisms.

The responsible party for overseeing and assuring plan updates is the Pulaski County Office of Emergency Management. At this time, the maintenance procedures for the Mitigation Plan will be conducted at the LEPC meeting, which are held quarterly. Each community's representative will be responsible for monitoring and evaluating the progress of the mitigation strategies in the plan. The team members will monitor the plan by providing a mitigation planning update at each quarterly meeting.

During the last LEPC meeting of each year, the sub-committee will meet to review and evaluate each goal and objective to determine their relevance to changing situations in Pulaski County, as well as changes in State or Federal policy, and to ensure that they are addressing current and expected conditions. The Sub-committee will also review and evaluate the risk assessment portion of the plan to determine if this information should be updated or modified. The parties or agencies responsible for the various implementation actions (identified in Section 4) will report on the status of their projects and will evaluate which implementation processes worked well, any difficulties encountered, how coordination efforts were proceeding, and which strategies should be revised. The sub-committee will also evaluate Plan content to ensure it is still relevant to current Mitigation Plan Standards and relevant regarding method of public participation, evaluations, updates and administration.

The responsible entity will then have three months to update and make changes to the plan before submitting it to the Sub-Committee members and the State Hazard Mitigation Officer. If no changes are necessary, the State Hazard Mitigation Officer will be given a justification for this determination. Comments and recommendations offered by Sub-Committee members and the State Hazard Mitigation Officer will be incorporated into the plan update.

The HMPT will take into account any changes in the plan and incorporate the information accordingly in its next update. The HMPT will incorporate any relevant information into the next plan update.

Since future plans and government regulations might need to be adopted into the Hazard Mitigation Plan, Pulaski County Quorum Court will be informed of any necessary changes to the plan by the Team Leader, to be adopted into the Plan by

County resolution. The Arkansas Department of Emergency Management will be contacted as necessary for professional and technical advice as needed.

Additionally, if any of the participating jurisdictions plan to apply for future FEMA Hazard Mitigation Grants, the public will be invited to comment before the application is submitted, per the HMA grant application guidelines.

1.2.2 Incorporation into Existing Planning Mechanisms

The Pulaski County Hazard Mitigation Plan is an overarching document that is both comprised of, and contributes to various other local plans. In creating this HMP, all the planning documents identified below were consulted and reviewed in turn, when each of these other plans are updated, they will be measured against the contents of the PCHMP.

Below is a list of the local participant's various planning efforts, sole or jointly administered programs, and documents. While each plan can stand alone, their review and functional understanding was pivotal in the development of this plan and further strengthens and improves the participant's resilience to disasters.

- Comprehensive Master Plan
- Land use Plan
- Local Emergency Operations Plan
- Storm Water Management Plan
- Stream Management Plan
- Subdivision Management Plan
- Community Wildfire Protection Plan
- Economic Development Plan

Pulaski County currently has the following plans in place: Comprehensive Master Plan, Land Use Plan, Local Emergency Operations Plan, Storm Water Management Plan, Stream Management Plan, Subdivision Management Plan, Community Wildfire Protection Plan, and Economic Development Plan. The HMG Plan will be reviewed and integrated into the existing plan by approval from the Pulaski County Quorum Court. The HMG Plan can also be used when developing the County annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the Quorum Court.

Cammack Village did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through the Cammack Village City Council. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the City annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the City Council.

The City of Jacksonville currently has a Comprehensive Master Plan, Local Emergency Operations Plan, Land Use Plan, Continuity of Operations Plan, Storm Water Management Plan, Adopted Zoning Ordinance, Adopted Subdivision Management and Economic Development Plan. The HMG Plan will be reviewed and integrated into the existing plan by approval from the Jacksonville City Council. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the City annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the City Council.

The City of Little Rock currently has Local Emergency Operations Plan, Land Use Plan, Storm water Management Plan, Subdivision Management Plan and Economic Development Plan and Adopted Stream Management. The HMG Plan will be reviewed and integrated into the existing plan by approval from the Jacksonville City Council. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the City annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the City Council.

The City of Maumelle currently has the following plans in place: Comprehensive Master Plan, Land Use Plan, Local Emergency Operations Plan, Storm Water Management Plan, Stream Management Plan, Subdivision Management Plan, Community Wildfire Protection Plan, and Economic Development Plan. The HMG Plan will be reviewed and integrated into the existing plan by approval from the Jacksonville City Council. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the City annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the City Council.

The City of North Little Rock currently has a Comprehensive Master Plan, Land Use Plan, Continuity of Operations Plan, and a Storm Water Management Plan. The HMG Plan will be reviewed and integrated into the existing plan by approval from the Jacksonville City Council. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the City annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the City Council.

The City of Sherwood currently has a Comprehensive Master Plan, Land Use Plan, Local Emergency Operations Plan, Storm Water Management Plan, Stream Management Plan, Subdivision Management Plan, Community Wildfire Protection Plan, and Economic Development Plan. The HMG Plan will be reviewed and integrated into the existing plan by approval from the Jacksonville City Council. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the City annual budget for Mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the City Council.

Jacksonville – North Pulaski School District did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through School Board. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the school's annual budget for mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the School Board.

Little Rock School District did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through School Board. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the school's annual budget for mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the School Board.

Pulaski County Special School District did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through School Board. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the school's annual budget for mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the School Board.

North Little Rock School District did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through School Board. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the school's annual budget for mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the School Board.

Arkansas School for the Blind did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through School Board. The HMG Plan can be integrated into those Plans. The HMG Plan can also be used when developing the school's annual budget for mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the School Board.

Arkansas School for the Deaf did not report any existing plans except for the previous Hazard Mitigation Plan. Any future Plans will be approved through School Board. The HMG Plan can be integrated into those Plans. The HMG Plan

can also be used when developing the school's annual budget for mitigation education and awareness, new and existing construction, infrastructure improvements and for prioritizing grant development projects which also would need approval from the School Board.

The Planning Team was asked how the 2014 updated Plan had be utilized over the past five years. Below are the responses:

- Pulaski County Office of Emergency Services: The County increased a line item in their budget for some new tornado sirens that help warn the public for sever weather. They also implemented the National Weather Service "Storm Ready Program' guidelines. The PCHMGP was also utilized when the County conducted their annual Emergency Operation Plan (EOP) update. The County has successfully completed several drainage projects over the past five years.
- Central Arkansas Water who was a member of the Planning Team provided information that they have used the PCHMP to update their Emergency Action Plan (EOP) as well as their America's Water Infrastructure Act (AWIA) Plan. Central Arkansas Water conducts inspections, maintains and upgrades to the dams on at Reservoir Park and on Lake Maumelle to prevent possible breaches. Emergency back-up power has been added to many of the water/wastewater treatment plants/lift stations that they own.
- The City of Sherwood has acquired several homes in their area with a priority on Repetitive Loss and Severe Repetitive Loss Structures. These projects have had a direct impact on the City's annual budget and planning priorities. The City has also made drainage improvements to mitigate flooding of homes and streets. Storm Siren have been updated and are in the City Plan to continue to update and add more for citizen's protections. The PCHMP was used when creating their own "in-house" Hazard Mitigation Plan as well as updating their existing Emergency Response Plan.
- UAMS used the Pulaski County mitigation plan as one of the bases for our Hazard Vulnerability Assessments, to prioritize our lists of HVA's and our management to help reduce loss of life, property and economic damage from exposure to natural and man-made disasters. The PCHMGP was also used to develop employee awareness to hazards and mitigation response. Improved internal services to include warning systems, response and protection of the UAMS system.
- Pulaski County Special School District (PCSSD) has used the past PCHMGP when developing plans to build tornado shelters at their schools. They have successfully completed several and plan to include a new one at the Lawson Elementary school in the next couple of years. The school has also been able to mitigate some flooding issues with drainage projects and will continue to use the Plan to guide them on other possible natural hazard migration projects to protect their staff and students. The Plan was utilized when updating their annual Emergency Operations Plan (EOP) and bringing awareness (education) for the need for drills for fire and tornado safety.

Pulaski County and plan participants currently use state laws pertaining to compliance with the National Flood Insurance Program as well as state fire codes, to encourage compliance with its hazard mitigation programs. These existing mechanisms have hazard mitigation strategies integrated into them. Pulaski County, as every other county in the State, has a current Emergency Operations Plan. The Hazard Mitigation Plan will become an annex of the EOP for future submissions.

The Pulaski County Hazard Mitigation Plan will be available for public view on the Pulaski County Office of Emergency Management website and the Central Arkansas Planning and Development District's website http://www.capdd.org/index.php/fema-hazard-mitigation-plans.html for any entity or citizen who wishes to view or make a copy of it. Copies will also be made available at public libraries, the Pulaski County Courthouse in Little Rock, the city halls of Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood and Wrightsville the offices of Jacksonville- North Pulaski School District, Little Rock School District, Pulaski County Special School District, North Little Rock School District, Arkansas School for the Blind and Arkansas School for the Deaf.

Pulaski County Quorum Court, City Councils and the Board of Directors of the school districts will be adopting the approved Hazard Mitigation Plan by formal adoption or resolution in their existing plans that are relevant to Hazard Mitigation. The same process will also be followed when parts of the Pulaski County Hazard Mitigation Plan are

incorporated into community planning mechanisms.

Any participant without previous plans in place will be encouraged to develop zoning plans and other land ordinance plans to incorporate mitigation strategies. Participants incorporating the Pulaski County Hazard Mitigation Plan pertain to them. After these discussions, each incorporating mechanism will follow their local laws or guidelines necessary for implementation through open forum public meetings. Each incorporating party will monitor the progress of any incorporated mitigation strategies and report the success or failure to the Local Emergency Planning Committee for inclusion in its annual report. After each update of the Pulaski County Hazard Mitigation Plan, each incorporating participant will be informed of the changes so they can reflect these changes in their plans also. Incorporating the plan or parts of the plan into other plans will be done by vote at the regular quorum court/city council/school board meetings and passed by resolution.

All participating jurisdictions will use the risk assessment that was conducted for the mitigation plan for creating strategies when dealing with hazards as well as the budget. The data and maps will be used as supporting documentation to encourage participating jurisdictions to address the hazards that affect their areas and organizations and can be used in grant applications.

Pulaski County will be incorporating the Pulaski County Hazard Mitigation Plan into the Pulaski County Continuity of Operations Plan, and any future county land use ordinances and/or plans by following the laws set forth by the county government. Incorporating the plan (and any plan) into other county plans will be done by vote at the regular quorum court meetings and passed by resolution.

Participating school districts will consider incorporating the Pulaski County Hazard Mitigation Plan into their existing emergency preparedness, response and recovery plans, such as a Continuity of Operations Plan, where applicable by following the rules set forth by each school board. Incorporating the plan into any existing or future plans will be done at regular school board meetings by resolution of the School Board.

The Universities may consider incorporating the Pulaski County Hazard Mitigation Plan into their existing emergency preparedness, response and recovery plans, such as a Continuity of Operations Plan, where applicable by following the rules set forth by the Board of Visitors. Incorporating the plan into any existing or future plans will be done at board meetings by resolution of the Board of Visitors.

1.2.3 Continuous Public Involvement

The City of Little Rock and entities of Pulaski County are dedicated to involving the public directly in the continual reshaping and updating of the Pulaski County Hazard Mitigation Plan. The Hazard Mitigation HMPT members are responsible for the annual monitoring, evaluation, and update of the plan. Although they represent the public to some extent, the public will be able to directly comment on and provide feedback about the plan.

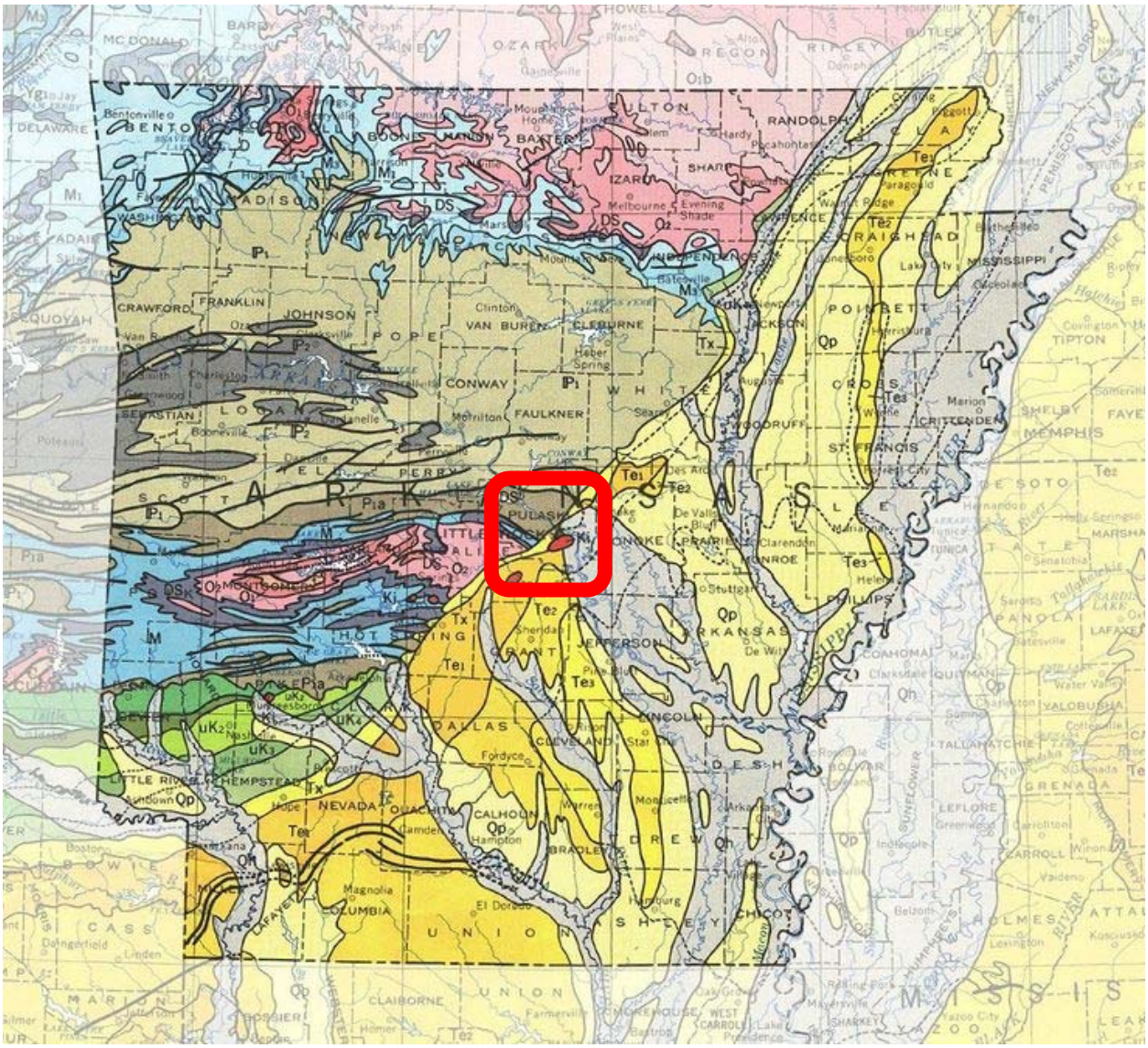
Copies of the FEMA approved Pulaski County Hazard Mitigation Plan will be available at http://www.capdd.org/index.php/fema-hazard-mitigation-plans.html. The plan will also be available at the County Courthouse, City Halls of each participating city, public libraries, universities and schools for public review. Contained in the plan are the address, phone number, and e-mail of the Director of the Pulaski County Office of Emergency Management, the primary point of contact for the plan.

A public announcement inviting all interested parties will be made prior to each quarterly LEPC meeting, including the December LEPC meeting during which the Hazard Mitigation Planning Team reviews and evaluates the plan in its entirety. This meeting will provide the public a forum for which the general public can express concerns, opinions, or

ideas about the plan. The City of Little Rock and the Pulaski County LEPC will publicize and host this meeting. Following the meeting, the evaluation committee will review the comments and make changes to the plan, as appropriate.

SECTION 2: Planning Area and Resources

2.1 General Geography



2.1.1 Topography

Pulaski County is a county in US State of Arkansas with a population of 39,911 which makes it the most populous county in Arkansas. Its county seat is Little Rock, which is also Arkansas's capital and largest city. Pulaski County comprises 808 square miles of which 760 square miles is land and 48 square miles is water. The landscape of the county is rugged

terrain western and northern and rolling hills in the southern tip with the Arkansas River Valley delta in the east. Pulaski County is the most populous county in the state.

County is Pulaski included in the Little Rock- North Little Rock – Conway, AR Metropolitan Statistical Area which has 731,612 people in the 2015 census estimates. The Little Rock, North Little Rock Combined Statstistical Area had 904,469 people in the 2015 census estimates. Adjacent counties to Pulaski County include: Faulkner County (north), Lonoke County (east), Grant County (south), Jefferson County (south), Saline County (west), and Perry County (northwest).

According to data gatherered by the Shuttle Radar Topography Mission, the lowest elevation in Pulaski County is 36 meters (118 feet). This ranks Pulaski County 33rd in terms of lowest elevations when compared to a total of 75 counties in Arkansas. Pulaski County's highest elevation is 116 meters (381 feet) which ranks it 66th in terms of highest elevations compared to the total 75 counties in Arkansas.

Of the five geologic provinces present in Arkansas, three are present in Pualski County. These include the Ouachita Mountains, Mississippi Embayment, and Gulf Costal Plain Provinces. Each province exhibits distinctly diffrerent geology, soil type and topography that may affect the occurrence and distribution of natural hazards in the Pulaski County and each participating jurisdicition (Pulaski County Planning Area).

2.1.2 Rivers and Watersheds

The Arkansas River is a major tributary of the Mississippi River. It generally flows to the east and southeast as it traverses the U.S. states of Colorado, Kansas, Oklahoma, and Arkansas. The river's source basin lies in the western United States in Colorado, specifically the Arkansas River Valley, where the headwaters derive from the snowpack in the Sawatch and Mosquito mountain ranges. It then flows east into the Midwest via Kansas, and finally into the South through Oklahoma and Arkansas. As the Arkansas River flows through Pulaski County it bisects Little Rock and North Little Rock.

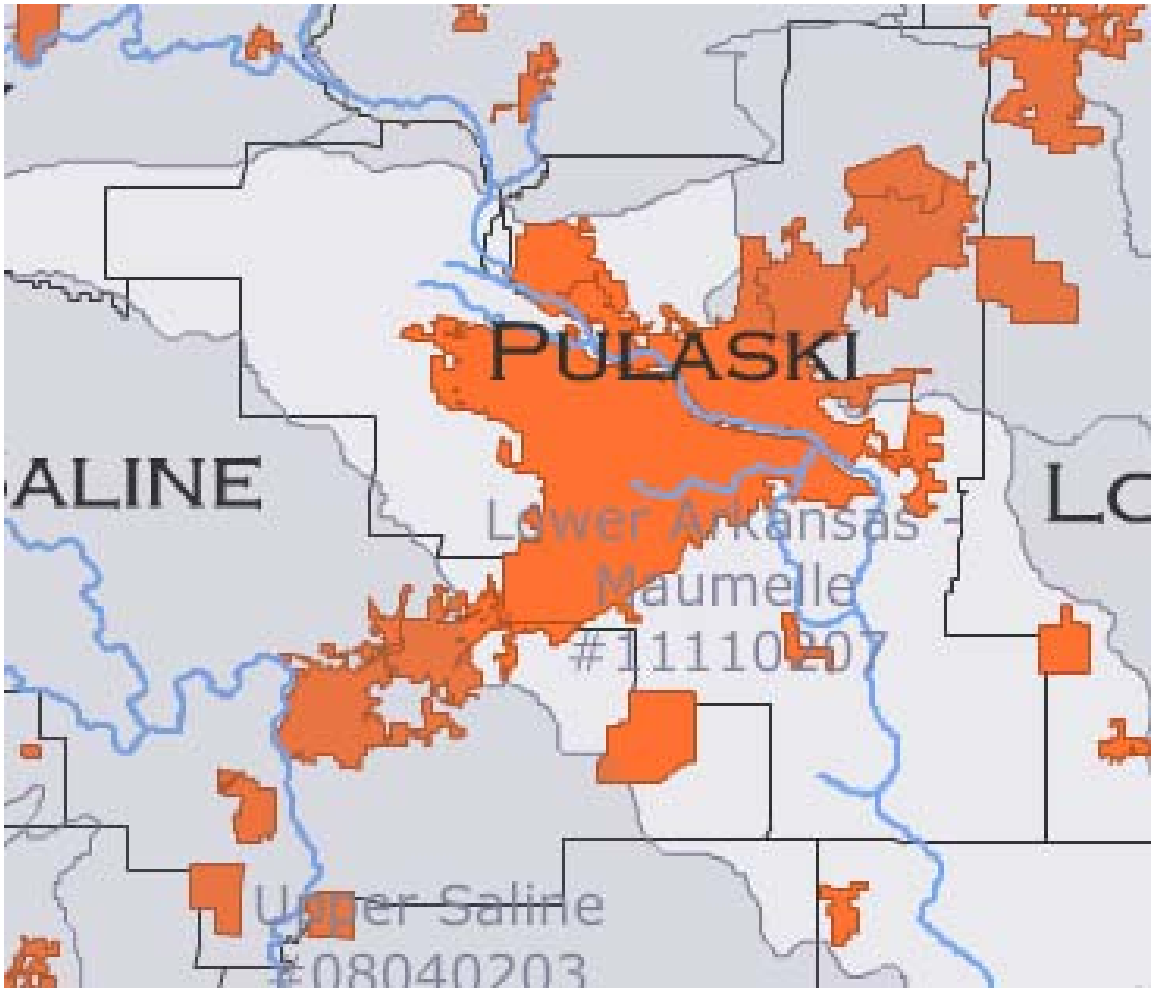
The Little Maumelle River is a stream located just 4.9 miles from Maumelle in Pulaski County. This stream is used primarily for fishing recreation.

Bayou Meto, a slow moving stream that originates in northern Pulaski County at the confluence of several creeks west of Little Rock Air Force Base and travels 150 miles south and east through Lonoke and Jefferson counties before empting into the Arkansas River a few miles southwest of Gillett, Arkansas. Pulaski County also has Pennigton Bayou which is a tributary off the Arkansas river near the community of Woodson. Shilcotts Bayou and White Oak Bayou also transverse through Pulaski County.

There are 16 lakes and 5 resevoirs in Pulaski County as well.

The majority of Pulaski County is drained into the Lower Arkansas – Maumelle Watershed. The north east sector of Pulaski County drains into the Bayou Meto watershed and the very northern tip of the county that is adjacent to Faulkner County drains into the Lake Conway – Point Remove watershed.

Other watersheds that affect Pulaski County include: Bayout Meto, Fourche La Fave, Lake Conway, Lower Arkansas, Lower White- Bayou Des Arc and upper Saline.



2.2 General Land Use/Analyzing Development Trends

The economic base for Pulaski County is largely government and support services, Metropolitan Pulaski County offers many educational and cultural opportunitites such as Arkansas Arts center, the Museum of Science and History, the University of Arkansas at Little Rock and the Little Rock Zoo and Pinnacle Mountain State Park, an 1,800 acre environmental park, is only 15 miles from Little Rock.

According to Census data, population trends are estimated to increase by 2.6% and the employment average staying with the national average.

Land Use for Lower Arkansas – Maumelle Watershed:

- Forest 52.3%
- Cropland: 14.0%
- Grassland: 12.1%
- Suburban: 7.3%
- Water: 6.1%
- Transitional: 5.4%
- Urban 2.4%

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Jurisdiction	Planning and Regulatory Capabilities														
	Comprehensive / Master Plans	Local Emergency Operations Plan	Land Use Plan	Continuity of Operations Plan	County Foreman	Stormwater Management Plan	Adopted Stream Management	Adopted Zoning Ordinance	Adopted Subdivision Management	Community Wildfire Protection Plan	Building Codes	Fire Department ISO Rating	Development Ordinance	Site Plan Review Requirements	Economic Development Plan
Pulaski County	X	X	X	X	X	X	X	X	X	X	X	*	X	X	X
Cammack Village															
Jacksonville	X	X	X	X		X		X	X		X				X
Little Rock		X	X			X		X	X		X				
Maumelle	X	X	X	X		X	X	X	X		X	2	X	X	X
North Little Rock	X		X	X		X		X	X		X				
Sherwood	X	X	X	X		X		X	X		X	2	X	X	
Wrightsville												9/ 10			
Jacksonville-North Pulaski School Dist															
Little Rock School Dist															
Pulaski County Special School District															
North Little Rock SD															
Arkansas School for the Blind															
Arkansas School for the Deaf															

*Other Fire Departments in the unincorporated Pulaski County:

Department Name	ISO Rating
Arch Street	4/4X
Camp Robinson	5/9
Crystal	3
East Pulaski	5/7
Gravel Ridge	2

Hensley	6/9
Hwy. 365 South	9
Jacksonville	2
Lake Maumelle	6/9
Little Rock	1
Maumelle	2
McAlmont	5
Northeast Saline County	7/9
North Little Rock	1
North Pulaski	4
Oak Grove	4
Quail Creek	9
Runyan Acres	3
Scott	7/10
Sherwood	2
Southbend	7/10
Sweet Home	4/4X
West Pulaski	6/9
Williams Junction	4/10
Wrightsville	9/10

Jurisdiction	Administrative and Technical Capabilities								
	Planning Commission	Maintenance Programs to Reduce Risk	Mutual Aid Agreements	GIS Analysts or	Warning Systems/Services	Hazard Data and Information	Grant Writers	Emergency	Floodplain Administrator
Pulaski County		X	X	X	X	X	X	X	X
Jacksonville	X		X		X		X	X	X
Little Rock	X	X	X	X	X		X	X	X
Maumelle	X	X	X	X	X	X	X	X	X
North Little Rock	X		X	X	X			X	X
Sherwood	X	X		X	X	X	X	X	X
Wrightsville			X		X				X
Jacksonville-North SD									
Little Rock School Dist									
North Little Rock SD									
Pulaski Co Special SD									

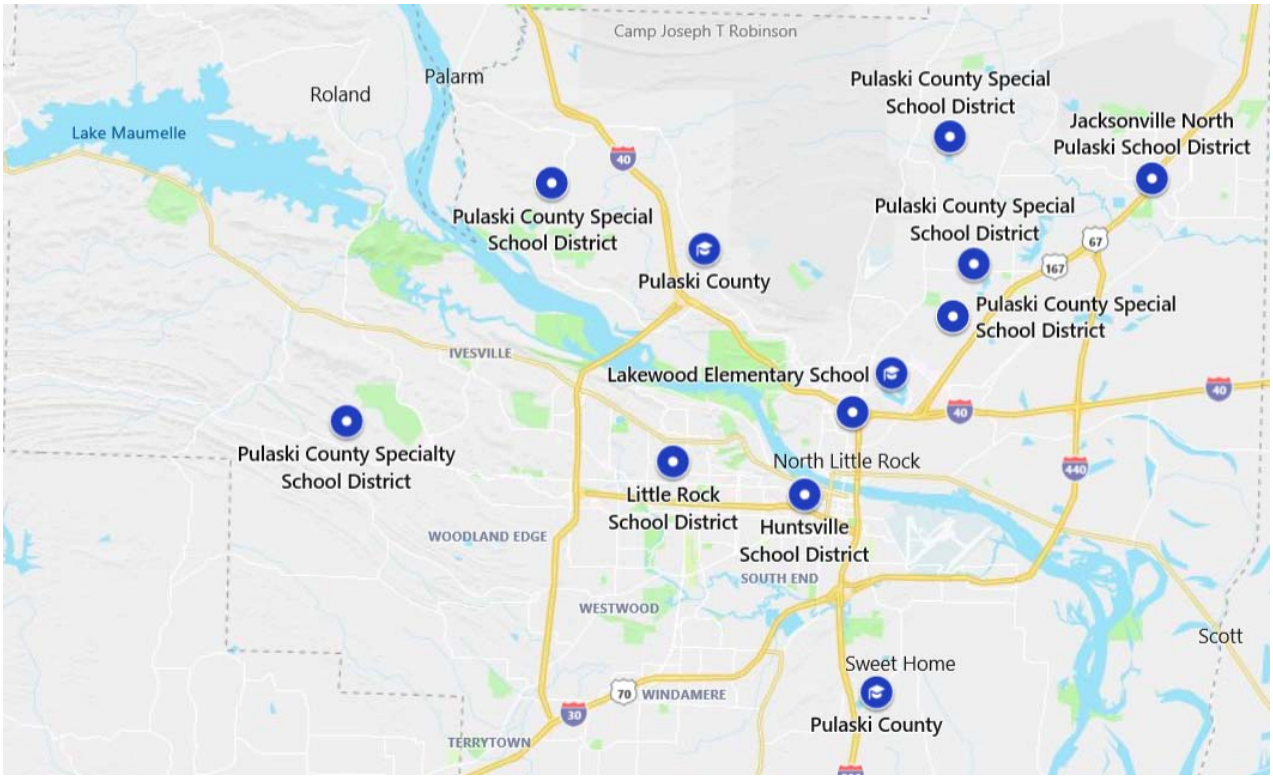
LR School for the Blind									
LR School for the Deaf									

Education and Outreach Capabilities							
	Pulaski County	Jacksonville	Little Rock	Maumelle	North Little Rock	Sherwood	Wrightsville
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations				X		X	X
Ongoing public education or information program				X		X	
Natural disaster or safety related school programs				X			
StormReady certification							
Firewise Communities certification							
Public-private partnership initiatives addressing disaster-related issues							
Website	X	X	X	X	X	X	X
Social Media (Facebook, Twitter, etc.)	X	X	X	X		X	
Newspaper/Local Media	X		X	X	X	X	
Mobile Alert System (such as Code RED)	X	X	X	X		X	
Radio			X			X	
Phone	X	X	X	X		X	
Community Mail-Outs				X			
Public Meetings, Quorum Court, City Council	X	X	X	X	X	X	X

	Education and Outreach Capabilities					
	Jacksonville – North SD	North Little Rock SD	Little Rock SD	Pulaski Co Special SD	Ark School for the Blind	Ark School for the Deaf
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations						
Ongoing public education or information program						
Natural disaster or safety related school programs						
StormReady certification						
Firewise Communities certification						
Public-private partnership initiatives addressing disaster-related issues						
Website	X	X	X	X	X	X
Social Media (Facebook, Twitter, etc.)	X	X	X	X	X	X
Newspaper/Local Media	X	X				
Mobile Alert System (such as Code RED)	X	X				
Radio						
Phone	X	X				
Community Mail-Outs						
Public Meetings/ School Board Meetings	X	X	X	X	X	X

Local Utilities							
UTILITY	*Pulaski County*	*Jacksonville*	*Little Rock*	*Maumelle*	*North Little Rock*	*Sherwood*	*Wrightsville*
Water Distribution		Jacksonville Waterworks	Central Ark. Water	Central Ark. Water	Central Ark. Water	Central Ark. Water	Central Ark. Water
Wastewater Collection		Jacksonville Wastewater Utility	Central Ark. Water	NLR WW	NLR WW	NLR WW	Wrightsville WW Utility
Wastewater Treatment		Jacksonville Wastewater Utility	Central Ark. Water	NLR WW	NLR WW	Sherwood WW Utility	Wrightsville WW Utility
Electricity		Entergy, First Electric	Entergy First Electric	Entergy	NLR Electric	First Electric Entergy NLR Electric	Entergy
Natural Gas		Reliant Energy	Centerpoint Energy	Centerpoint Energy	Centerpoint Energy	Centerpoint Energy	Centerpoint Energy

School Districts: There are four public school districts located in Pulaski County School Districts – Jacksonville – North Pulaski, Little Rock, North Little Rock and Pulaski County Special School District.



Pulaski School District School Facilities

#	Jacksonville – North Pulaski School District	Little Rock School District	North Little Rock School District	Pulaski County Special School District
1.	Administrative Office 1414 W. Main Jacksonville, AR 72076 501-241-2080	Administrative Office 810 W. Markham Little Rock, AR 72201 501-447-1000	Administrative Office 2400 Willow NLR, AR 72114 501-771-8000	Administrative Office 925 E. Dixon Road Little Rock AR 72206 501-234-2000
2.	Homer Adkins Elem. 500 Cloverdale Road Jacksonville, AR 72076 501-982-3117	Accelerated LC 7701 Scott Hamilton Little Rock, AR 72209 501-447-1350	Boone Park Elem 1400 Crutcher St. NLR, AR 72114 501-340-5160	Baker Elementary 15001 Kanis Road Little Rock, AR 72223 501-228-3250
3.	Bayou Meto Elem. 26405 Hwy 107 Jacksonville, AR 72076	Bale Elem. 6501 West 32nd Street	Center of Excellence 201 W. 22nd St NLR, AR 72114	Cato Elem 9906 Jacksonville Cato Rd.

	501-988-4131	Little Rock, AR 72209	501-975-3895	Sherwood, AR 72120 501-833-1160
4.	Bobby G. Lester Elem. 601 Harris Road Jacksonville, AR 72076 501-982-7456	Baseline Academy 3623 Baseline Rd Little Rock, AR 72209 501-447-3700	Crestwood Elem. 1901 Crestwood Rd. NLR, AR 72116	Chenal Elem 21201 Denny Road Little Rock, AR 72223 501-721-7450
5.	Murrell Taylor Elem. 1401 Murrell Taylor Dr Jacksonville, AR 72076 501-985-1581	Booker Arts Magnet Elem. 206 Barber St. Little Rock, AR 72211 501-447-3800	Glenview Elem. 4901 E. 19th St. NLR, AR 72117 501-955-3630	College Station Elem 4710 Frazier Pike Little Rock, AR 72206 501-490-5750
6.	Pinewood Elem. 1919 Northeastern Ave. Jacksonville, AR 72076 501-982-7571	Brady Elem. 7915 W. Markham Little Rock, Ar 72205 501-447-3900	Indian Hills Elem. 6800 Indian Hills Dr. NLR, AR 72116 501-835-5622	Crystal Hill Elem 5001 Northshore Dr. NLR, AR 72118 501-791-8000
7.	Warren Dupree Elm 700 Gregory St Jacksonville, AR 72076 501-982-9541	Carver Elem. 2100 E. 6th St. Little Rock, AR 72202 501-447-4000	Lakewood Elem. 1800 Fairway Ave. NLR, AR 72116 501-771-8270	Daisy Bates Elem. 14300 Dineen Dr. Little Rock, AR 72206 501-897-2171
8.	Jacksonville Middle School 718 Harris Road Jacksonville, AR 72076 501-982-9436	Central High 1500 S. Park St Little Rock, AR 72202 501-447-1400	Meadow Park Elem. 801 E. Bethany Rd. NLR, AR 72117 501-955-3620	Harris Elem. 4424 Hwy 161 N. NLR, AR 72117 501-955-3550
9.	Jacksonville High Schl 1301 W. Main Street Jacksonville, AR 72076 501-982-2128	Chicot Elem 11100 Chicot Rd Mabelvale, AR 72013	NLR Middle School (6th 7th 8th) 200 Lakeview Rd NLR, AR 72116 501-771-8250	Joe T. Robinson Elem. 21600 Hwy 10 Little Rock, AR 72223 501-868-2420
10.		Cloverdale Middle Sch 6300 Hinkson Road Little Rock, AR 72209 501-447-2500	Northern Little Rock Academy (9th) 5500 Lynch Drive NLR, AR 72117	Landmark Elem 16712 Arch Street Pk Little Rock, AR 72206 501-88-8790
11.		David O. Dodd Elem 6423 Stage Coach Rd	NLR High School 201 W. 22nd NLR, AR 72114 501-771-8100	Lawson Elem 19901 Lawson Rd Little Rock, AR 72210

		Little Rock, AR 72204		501-821-7000
12.		Don R. Roberts Elem. 16601 La Mache Dr. Little Rock, AR 72223 501-447-8300	Ridge Road Elem. 4601 Ridge Rd NLR, AR 72116 501-771-8155	Oak Grove Elem 5703 Oak Grove Rd NLR, AR 72116
13.		Dunbar Middle School 1100 Wright Ave. Little Rock, AR 72206 501-447-2600	7th Street Elem. 1200 Bishop Lindsey Ave. NLR, AR 72116 501-771-8155	Oak Brooke Elem 2200 Thorn Hill Sherwood, AR 72120 501-833-1190
14.		Fair Park Early Childhood Ctr. 616 N. Harrison Little Rock, AR 72205 501-447-4400		Pine Forest Elem 400 Pine Forest Dr Maumelle, AR 72113 501-851-5380
15.		Forest Heights Stem (K-8) 5901 Evergreen Drive Little Rock, AR 72205		Sylvan Hills Elem 402 Dee Jay Hudson Dr Sherwood, AR 72120 501-833-1140
16.		Forest Park Elem 1600 N. Tyler Little Rock, AR 72207		William Jefferson Clinton Elem 142 Hollywood Ave. Sherwood, AR 72120 501-833-1200
17.		Fulbright Elem. 300 Pleasant Valley Little Rock, AR 72212 501-447-4700		Joe T. Robinson Middle School 21201 Cantrell Little Rock, AR 72223
18.		Gyer Springs Early Childhood 5240 Mabelvale Pike Little Rock, AR 72209 501-447-4800		Maumelle Middle Sch 1000 Carnahan Dr Maumelle, AR 72113 501- 851-8990
19.		Gibbs International Elem. 1115 W. 16th St		Mills Middle School 1205 E. Dixon Rd

		Little Rock, AR 72202 501-447-4900		Little Rock, AR 72206 501-490-5370
20.		Hamilton Learning Academy 4015 Stannus Little Rock, AR 72204 501-447-3400		Sylvan Hills Middle School 1001 Johnson St Sherwood, AR 72120 501-833-1120
21.		Henderson Middle School 401- John Barrow Road Little Rock, AR 72205 501-447-2800		Joe T. Robinson High 21501 Cantrell Rd Little Rock, AR 72223 501-868-2400
22.		J. A. Fair High 13420 David O. Dodd Little Rock, AR 72210 501-447-1700		Maumelle High School 100 Victory Ln Maumelle, AR 72113 501-851-8530
23.		Jefferson Elem. 2600 N. McKinley Little Rock, AR 72202		Sylvan Hills High 484 Bear Paw Road Sherwood, AR 72120 501-833-1100
24.		Little Rock SW High 9715 Mabelvale Pike Little Rock, AR 72103 501-447-9103		Sylvan Hills North High School 10020 Bamboo Lane NLR, AR 72120 501-833-1170
25.		Little Rock West High 5701 Ranch Drive Little Rock, AR 72223 501-447-9103		Wilbur D. Mills University Studies 708 E. Dixon Road Little Rock, AR 72206 501-490-4700
26.		Hall High 6700 H. Street 501-447-1900 Little Rock, AR 72205 501-447-1900		
27.		Mabelvale Elem. 6700 H. Street Little Rock, AR 72103		

		501-447-5400		
28.		Mabelvale Middle Sch. 1081 Mabelvale West Mabelvale, AR 72103 501-447-3006		
29.		Mann Middle Sch. 1000 E. Roosevelt Little Rock, AR 72206 501-447-3100		
30.		M. L. K. Elem. 905 State Capitol Little Rock, AR 72202 501-447-5100		
31.		McClellan High Sch. 9417 Gyer Springs Little Rock, AR 72209 501-447-2100		
32.		McDermott Elem. 1200 Reservoir Rd. Little Rock, AR 72227 501-447-5500		
33.		Meadowcliff Elem. 25 Sheraton Dr. Little Rock, AR 72227 501-447-5500		
34.		Otter Creek Elem. 16000 Otter Creek Parkway Little Rock, AR 72210 501-447-5800		
35.		Parkview High Sch. 2501 John Barrow Rd Little Rock, AR 72204 501-447-2300		
36.		Pulaski Heights Elem. 319 N. Pine		

		Little Rock, AR 72205 501-447-5900		
37.		Rockerfeller Elem. 700 E. 17th St. Little Rock, AR 72206 501-447-6200		
38.		Romine Elem. 3400 Romine Rd Little Rock, AR 72204 501-447-6300		
39.		Stephens Elem 3700 W. 18th St. Little Rock, AR 72204 501-447-6400		
40.		Terry Elem. 10800 Mara Lynn Dr. Little Rock, AR 72204 501-447-6500		
41.		Wakefield Elem. 75 Westminster Dr. Little Rock, AR 72209 501-447-6600		
42.		Washington Elem. 2700 Main St Little Rock, AR 72206 501-447-6700		
43.		Watson Elem. 7000 Valley Dr. Little Rock, AR 72209 501-447-6800		
44.		Western Hills Elem 4901 Western Hills Ave. Little Rock, AR 72204 501-447-6900		
45.		Williams Elem 7300 Evergreen Little Rock, AR 72207 501-447-7100		

2.2.1.1 Improving Capabilities

Leadership and representatives in all participating jurisdictions are very receptive to mitigation. The Pulaski County, the Local Jurisdictions and Pulaski County OEM make mitigation a first priority. Representatives are actively seeking additional funding to improve the readiness and preparedness of their communities. Ways the communities are improving capabilities are:

- Becoming StormReady Certified and organizing a Community Emergency Response Team (CERT).
- Becoming Firewise Communities
- Regularly attend state-wide full-scale drills for evacuation.
- Expand upon education and outreach by establishing and promoting cooling centers and shelters.
- Expand the Road Department Budget to improve culverts, box tiles, and water crossings.
- Representatives to attend training through ADEM and FEMA to include ICS and NIMS.
- Create a Transportation Plan to include in the Master Plan.
- Regular Fire Department trainings including fire mitigation
- Utilize existing Planning and code enforcement departments to review and strengthen building codes and ordinances with disaster mitigation in mind.

Improving Capabilities by Jurisdiction

Pulaski County could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The county plans to include the Hazard Mitigation plan with their existing Emergency plans

The City of Cammack Village could improve their capabilities by implementing annual goals for management by addressing mitigation activities starting with joining the National Flood Insurance Program, establishing a trained floodplain manager. Inventory and address mitigation activities. Create an emergency response plan and include Hazard Mitigation plan.

City of Jacksonville could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The city plans to include the Hazard Mitigation plan with their existing Emergency plans.

City of Little Rock could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The city plans to include the Hazard Mitigation plan with their existing Emergency plans.

City of Maumelle could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The city plans to include the Hazard Mitigation plan with their existing Emergency plans.

City of North Little Rock could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The county plans to include the Hazard Mitigation plan with their existing Emergency plans.

The City of Sherwood could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to

accomplish these goals. The county plans to include the Hazard Mitigation plan with their existing Emergency plans.

The City Wrightsville could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The city could improve building codes and ordinances with mitigation in mind. The county plans to include the Hazard Mitigation plan with their existing Emergency plans.

Pulaski Co Special School District could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The school plans to include the Hazard Mitigation plan with their existing Emergency plans.

Little Rock Special School District could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The school plans to include the Hazard Mitigation plan with their existing Emergency plans.

Jacksonville/North Pulaski School District could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The school plans to include the Hazard Mitigation plan with their existing Emergency plans.

School for the Blind could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The school plans to include the Hazard Mitigation plan with their existing Emergency plans.

School for the Deaf could improve their capabilities by implementing annual goals for management to address mitigation activities, and provide management and staff with additional training to accomplish these goals. The school plans to include the Hazard Mitigation plan with their existing Emergency plans.

2.2.2 NFIP Participation

Jurisdiction	NFIP Member	Community Identification Number	Init FHBM	Init FIRM	Current Effective Map Date	Reg-Emergency Date	CRS
Pulaski Co	Yes	050179B	10/25/77	07/16/81	06/07/19	07/16/81	No
Cammack Village	No	050310B	04/18/75	07/06/15	06/07/19	04/18/76	No
Jacksonville	Yes	050180B	02/01/74	09/29/78	06/07/19	09/29/78	Yes
Little Rock	Yes	050181B	03/01/74	03/04/80	06/07/19	03/04/80	Yes
Maumelle	Yes	050577B		11/02/94	07/06/15	02/29/88	No
North Little Rock	Yes	050182B	11/02/73	07/16/80	07/06/15	07/16/80	No
Sherwood	Yes	050235B	05/17/74	10/17/78	07/06/15	10/17/78	No
Wrightsville	Yes	050142B	10/25/77	07/16/81	07/06/15	03/07/17	No

NFIP Members	
Pulaski County	Participation: Pulaski County participates in the NFIP by assisting the residences with filling out documents for the NFIP and educating citizens about the NFIP program. The county plans to continue participating through continuing floodplain education, and staying in compliance with NFIP. The County maintains elevation certificates. **Insurance Summary:** There are 311 policies in force, $79,823,600 insurance in force, 313 paid losses with a total loss paid of $7,523,909.03. There have been 29 Substantial Damage Claims since 1978. **Staff Resources:** Pulaski County (Pulaski County Office of Emergency Management) has a Certified Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. If floodplain resources are needed that the county cannot provide, the County's CFM request assistance from the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** Pulaski County is in good standing with the NFIP, and there are no outstanding compliance issues. The last Community Assistance Visit (CAV) or Community Assistance was on 9/23/2009. Pulaski County intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the county's floodplain ordinance.
Jacksonville	**Participation:** Assisting the residences by assisting with the filling out documents for the NFIP and educating citizens about the NFIP program. Permits are issued for those wishing to build in the floodplain, and then the floodplain manager monitors the construction process to ensure compliance. The city plans to continue participating through continuing floodplain education, and staying in compliance with NFIP. The city maintains elevation certificates and has building code enforcement regulations. **Insurance Summary:** There are 257 policies in force, $52,903,600 insurance in force, 94 paid losses with a total loss paid of $1,157,117.30. There have been 5 Substantial Damage Claims since 1978. **Staff Resources:** The City of Jacksonville has a Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. The City floodplain manager is also the building code enforcement officer.

	If floodplain resources are needed that the city cannot provide, the City's CFM request assistance from the Pulaski County Floodplain Manager or the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** The City of Jacksonville is in good standing with the NFIP, and there are no outstanding compliance issues. The last Community Assistance Visit (CAV) or Community Assistance was on 11/11/2019. CRS class is 09 with a 5% discount rate. The City of Jacksonville intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the city's floodplain ordinance.
Little Rock	**Participation:** Assisting the residences by assisting with the filling out documents for the NFIP and educating citizens about the NFIP program. Permits are issued for those wishing to build in the floodplain, and then the floodplain manager monitors the construction process to ensure compliance. The city plans to continue to participating through continuing floodplain education, and staying in compliance with NFIP. The city maintains elevation certificates and has building code enforcement regulations. **Insurance Summary:** There are 1,112 policies in force, $270,134,300 insurance in force, 830 paid losses with a total loss paid of $12,134,300.44 with 74 Substantial Damage Claims since 1978. **Staff Resources:** The City of Little Rock has a Certified Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. The City floodplain manager is also the building code enforcement officer. If floodplain resources are needed that the city cannot provide, the City's CFM request assistance from the Pulaski County Floodplain Manager or the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** The City of Little Rock is in good standing with the NFIP, and there are no outstanding compliance issues. The last Community Assistance Visit (CAV) or Community Assistance was on 8/13/14. The City of Little Rock is a CRS classification of 07 with a 15% discount. The City of Little Rock intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the city's floodplain ordinance.
Maumelle	**Participation:** Assisting the residences by assisting with the filling out documents for the NFIP and educating citizens about the NFIP program. Permits are issued for those wishing to build in the floodplain, and then the floodplain manager monitors the construction process to ensure compliance. The city plans to continue participating through continuing floodplain education, and staying in compliance with NFIP. The city maintains elevation certificates and has building code enforcement regulations.

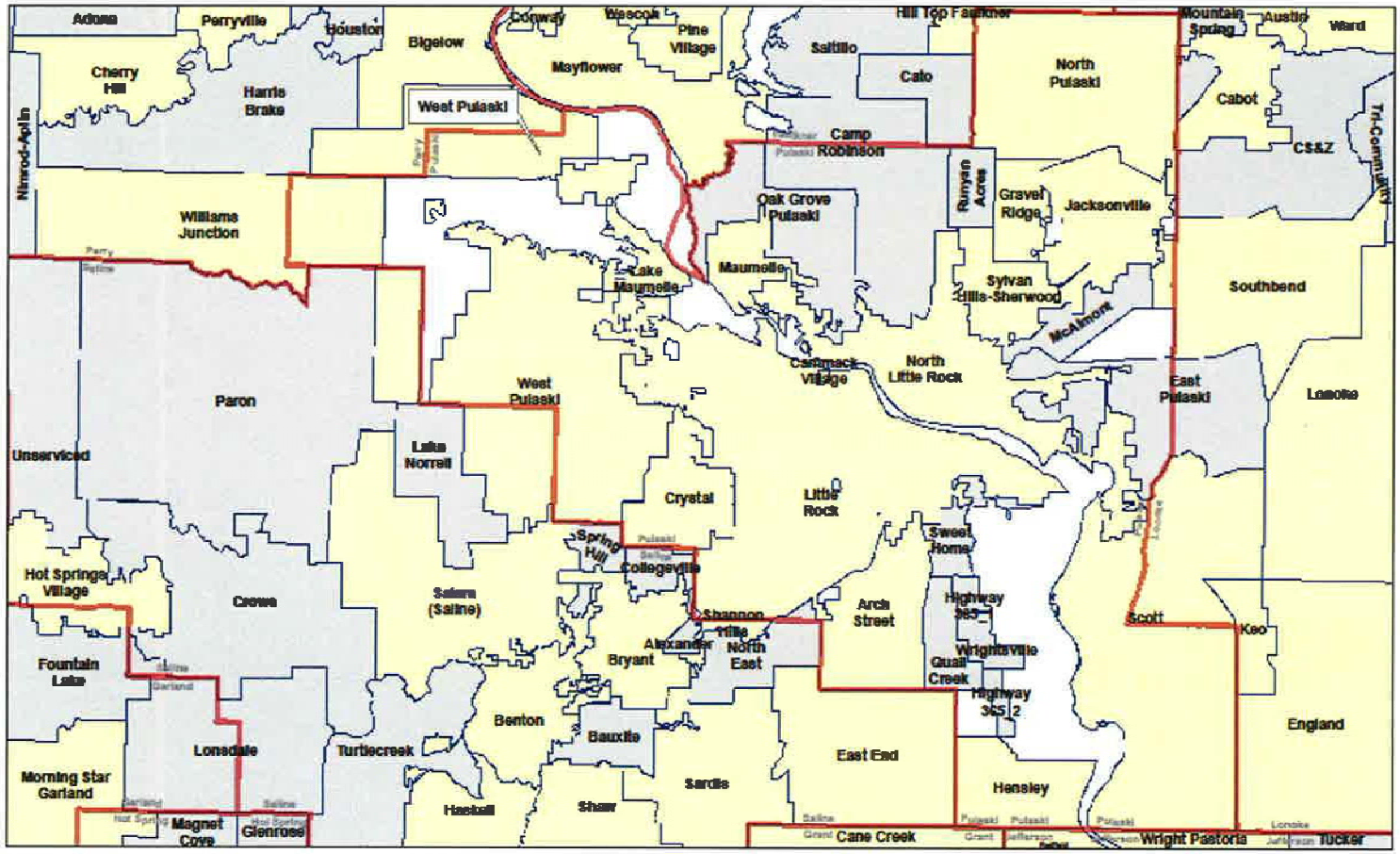
	Insurance Summary: There are 83 policies in force, $26,082,000 insurance in force, 10 paid losses with a total loss paid of $111,859.39. **Staff Resources:** The City of Maumelle has a Certified Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. If floodplain resources are needed that the city cannot provide, the City's CFM request assistance from the Pulaski County Floodplain Manager or the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** The City of Maumelle is in good standing with the NFIP, and there are no outstanding compliance issues. The last Community Assistance Visit (CAV) or Community Assistance was on 03/08/2019. The City of Maumelle intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the city's floodplain ordinance.
North Little Rock	**Participation:** Assisting the residences by assisting with the filling out documents for the NFIP and educating citizens about the NFIP program. Permits are issued for those wishing to build in the floodplain, and then the floodplain manager monitors the construction process to ensure compliance. The city plans to continue participating through continuing floodplain education, and staying in compliance with NFIP. The city maintains elevation certificates and has building code enforcement regulations. **Insurance Summary:** There are 493 policies in force, $102,951,100 insurance in force, 232 paid losses with a total loss paid of $3,743,200.56. There have been 12 Substantial Damage Claims since 1978. **Staff Resources:** The City of North Little Rock has a Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. If floodplain resources are needed that the city cannot provide, the City's CFM request assistance from the Pulaski County Floodplain Manager or the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** The City of North Little Rock is in good standing with the NFIP, and there are no outstanding compliance issues. The last Community Assistance Visit (CAV) or Community Assistance was on 8/8/2014. The City of North Little Rock intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the city's floodplain ordinance.
Sherwood	**Participation:** Assisting the residences by assisting with the filling out documents for the NFIP and educating citizens about the NFIP program. Permits are issued for those wishing to build in the floodplain, and then the

	floodplain manager monitors the construction process to ensure compliance. The city plans to continue participating through continuing floodplain education, and staying in compliance with NFIP. The city maintains elevation certificates and has building code enforcement regulations. **Insurance Summary:** There are 309 policies in force, $66,722,900 insurance in force, 197 paid losses with a total loss paid of $2,454,992.63. **Staff Resources:** The City of North Sherwood has a Certified Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. The City floodplain manager is also the City Engineer. If floodplain resources are needed that the city cannot provide, the City's CFM request assistance from the Pulaski County Floodplain Manager or the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** The City of Sherwood is in good standing with the NFIP, and there are no outstanding compliance issues. The last Community Assistance Visit (CAV) or Community Assistance was on 2/23/2017. The City of Sherwood intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the city's floodplain ordinance.
Wrightsville	**Participation:** Assisting the residences by assisting with the filling out documents for the NFIP and educating citizens about the NFIP program. Permits are issued for those wishing to build in the floodplain, and then the floodplain manager monitors the construction process to ensure compliance. The city plans to continue to participate through continuing floodplain education, and staying in compliance with NFIP. The city maintains elevation certificates and has building code enforcement regulations. **Insurance Summary:** *no information available.* **Staff Resources:** The City of Wrightsville has a Floodplain Manager who oversees the floodplain management. The NFIP administrative services include floodplain maps, permit reviews and inspections. If floodplain resources are needed that the city cannot provide, the City's CFM requests assistance from the Pulaski County Floodplain Manager or the Arkansas Natural Resource Conservation Service and FEMA. **Compliance History:** The City of Wrightsville is in good standing with the NFIP, and there are no outstanding compliance issues. The City of Wrightsville intends to maintain compliance with the NFIP by continuing to ensure all constructing, locating, substantially altering or changing the use of any structure or land after the effective date of the city's floodplain ordinance.

Cammack Village does not currently participate in the NFIP due to lack of community resources and the small size of the floodplain existing in their communities.

2.2.3 Fire Districts

Fire Districts that cover Pulaski County



Sources: County fire district coordinators and the Arkansas Forestry Commission. The University of Arkansas at Little Rock GIS Applications Laboratory compiled the data contained herein from various sources. Where the data was translated from one format to another, the UALR GIS Laboratory made all reasonable efforts to preserve the data quality. Acceptance or use of the data is done without any expressed or implied warranty. All of the fire districts have not been certified as of June 1, 2014.

- No fire coverage
- Other fire districts
- Districts in a pension plan
- County Boundary

Pulaski County

0 2.5 5 10 15 Miles

Fire Departments, Chief s name, station phone number, and ISO rating.

PULASKI
COUNTY
FIRE
DEPARTM
ENTS ISO
RATINGS

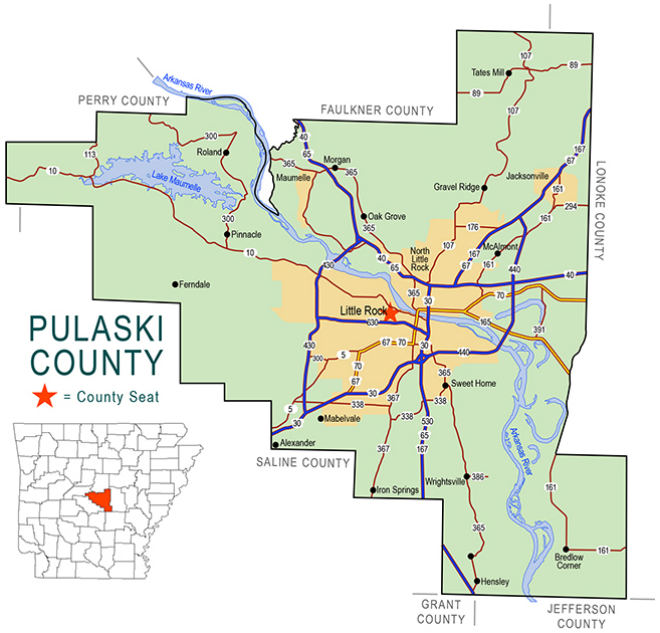
FIRE DEPARTMENT	ISO RATING	CHIEF NAME	STATION PHC
Alexander	2	Mark Ridgeway	847-5265
Arch Street	4/4X	Harvey Durham	888-4162
Camp Robinson	519	Stan Crisp	212-5280
Crystal	3	Chad Forshee	821-7099
East Pulaski	517	Steven Strawn	961-9116
Gravel Ridge	2	Andy Traffanstedt	835-3710
Hensley	619	David Jones	397-2728
Hwy. 365 South	9	Robert Foley	897-5811
Jacksonville	2	Alan Laughy	982-1616
Lake Maumelle	619	Lance Logan	868-7100
Little Rock	1	Delphone Hubbard	918-3700
Maumelle	2	Gerald Ezell	851-1337
McAlmont	5	Bobby Moss	563-1251
Northeast Saline	719	Rob Bradberry	847-1500
North Little Rock	1	Gerald Tucker	340-5377
North Pulaski	4	Randy Blakey	988-2494
Oak Grove	4	Dennis Poole	851-1581
Quail Creek	9	Cody Church	340-6911
Runyan Acres	3	Ken Partridge	835-8183
Scott	7/10	Ron Myers	961-2424
Sherwood	2	David Teague	835-0342
Southbend	7/10	Kenny Fraley	982-7729
Sweet Home	4/4X	Michael Marbley	490-2509
West Pulaski	619	Scott Joblin	821-9320
Williams Junction	4110	Atlas Smith	333-1939
Wrightsville	9/10	Art Willis	897-2111

8/10/2010 Updated

2.2.4 Transportation

The major highways in Pulaski County are I-30, I-40, Future I-57, I-430, I-440, I-530, I6-30, US Highway 65, US Highway 67, US Highway 70, US Highway 165, US Highway 167, Highway 5, Highway 10, Highway 100, Highway 161, Highway 300, Highway 338, Highway 365 and Highway 367.

2.3 General Data: Planning Area and Population



Pulaski County is Arkansas's fifth county, formed on December 15, 1818. The county is named for Casimir Pulaski, a Polish volunteer who saved George Washington's life during the American Revolution War.

Information from American Fact Finder (Census)

Jurisdiction	Population	Housing Units	Area in Square Miles	Population Density Per Square Mile of Land Area
Pulaski County	392,680	185,967	759.76	503.8
Cammack Village	763	365	0.29	2,569
Jacksonville	28364	12,049	28.10	1,009.40
Little Rock	193,524	98,026	119.20	1,623.5
Maumelle	17,163	7,742	12.5	1,424.60
North Little Rock	62,304	26,612	51.50	1,209.9
Sherwood	29,364	13,328	20.61	1,432.5
Wrightsville	2,114	unknown	unknown	804

SECTION 3: Hazard Identification and Risk Assessment

3.1 Hazard Identification and Prioritization

Hazard identification, the process of identifying hazard that threatens a given area, is the first step in the risk assessment process. Pulaski County has identified several natural hazards that, because they pose a threat to the County and its residents, have warranted a complete profile in this hazard mitigation plan. Please note that the update period of this plan is January 1, 2014 through December 31, 2019.

The following hazards were identified from historical information provided by HMPT members, newspapers, review of plans and reports, internet research, the State Mitigation Plan, and FEMA publication "Multi-Hazard-Identification and Risk Assessment", and information provided by FEMA and ADEM.

Hazards	Hazard Events during the update period
Dam Failure	No dam failures for Pulaski County.
Drought	393 events reported between 2015 and 2019
Earthquake	None
Extreme Heat	1 event reported between 2015 and 2019
Flood	12 flood and 73 flash flood events between 2015 and 2019
Thunderstorm	137 events including Hail, Lightning and High Winds between 2015 and 2019
Tornado	8 events between 2015 and 2019
Wildfire	103 wildfire events between 2015 and 2019
Winter Storm	3 winter storm events between 2015 and 2019

Although the "Land Subsidence" hazard was profiled in the original Pulaski County Hazard Mitigation Plan it is not being profiled in the plan update for the following reasons: 1) lack of previous occurrences (none documented), 2) the Hazard Mitigation Planning Team did agreed that this hazard does not affect any areas of Pulaski County based on history, lack of previous occurrences and lack of public concern about it. Furthermore, Land Subsidence was classified as "unlikely" for probability of future events.

High Winds and Hail- While profiled separately in the 2008 Pulaski County Hazard Mitigation Plan, "high winds" and "hail" will be included as a component of Thunderstorm for this plan update, as is commonly accepted by FEMA.

Presidential Disaster Declarations in Pulaski County from 2010 to current date			
Declaration #	Date	Purpose	Amnt. Obligated for Public Assistance (PA)
DR-4441	6/8/2019	Severe Storm & Flooding	$25,187,569.74
DR-4100	1/29/2013	Severe Winter Storm	$8,548,088.10
DR1975	5/2/2011	Severe Storms, Tornadoes & Associated Flooding	$49,951,392.96

3.2 Vulnerability and Risk Assessment by Hazard

The Pulaski County Hazard Mitigation Plan includes a description or profile, location, and extent of all natural hazards that can affect each jurisdiction.

Description describes the natural hazard that can affect the jurisdictions in the planning area.

Location (Geographic Area Affected) is where geographic areas in the planning area that are affected by the hazard, and when possible maps were used to illustrate the location. But for some hazards, such as tornados, the plan stated that the entire planning area is equally at risk to that hazard.

Extent describes the strength or magnitude of the hazard. This will usually be demonstrated with a scientific chart or scale.

Previous Occurrences lists past hazard events for each jurisdiction.

Probability of Future Events means the likelihood of the hazard occurring in the future and may be defined in terms of general descriptors, historical frequencies, and statistical probabilities. Statistical probabilities often refer to events of a specific size or strength. Hazard likelihood can also be compared using general descriptions or rankings. For the purpose of this plan we will use the general descriptors to describe the likelihood of hazard events based on historical frequency.

The percent probability was determined using the Poisson distribution, an equation that expresses the probability of a given number of events occurring in a fixed interval of time if these events occur with a known average rate and independently of the time since the last event. A description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction is included.

Impact and Overall Jurisdictional Vulnerability– is the consequence or effect of the hazard on the community and its assets. Impacts will be described by referencing historical disaster impacts and/or an estimate of potential future losses, such as percent damage of total exposure. It will identify structures, systems, populations or other community assets as defined by the community that are susceptible to

damage and loss from hazard events. It is a list of key issues or problem statements that clearly describes the community's greatest vulnerabilities and that will be addressed in the mitigation strategy.

Repetitive Loss Properties and Severe Repetitive Loss Properties- addresses NFIP insured structures describing the types (residential, commercial, institutional, etc.) and estimates the number of repetitive loss properties located in the identified flood hazard areas.

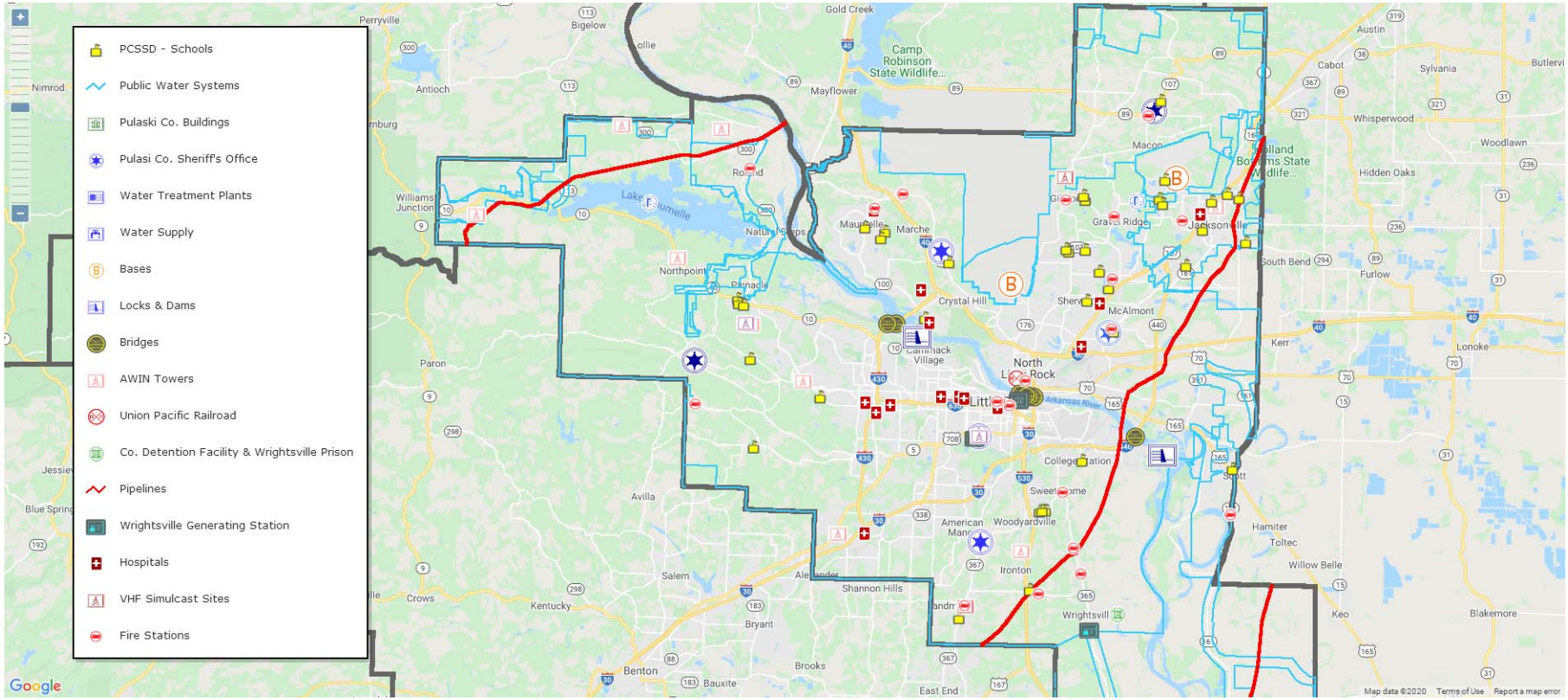
3.2.1 Critical Facilities

Critical facilities for each jurisdiction are provided below. If a hazard affects the entire planning area's structures and infrastructure, these critical facilities area included, unless otherwise stated in each hazard profile.

Critical Facilities for Pulaski County

1. Lake Maumelle for water supply
2. Little Rock Air Force Base
3. Terry Lock & Dam
4. Murray Lock & Dam
5. Harry L. Oswald Generating Station at Wrightsville on Hwy 365 South that's powered by natural gas
6. Natural gas pipeline off 145th street in Wrightsville
7. Pulaski County Detention Facility
8. Bridges over Arkansas River
    a. Broadway Bridge
    b. I-30 Bridge
    c. I-430 Bridge
    d. Big Dam Bridge
    e. Two Rivers Park Bridge
    f. I-440 Bridge
    g. Junction Bridge
    h. Main Street Bridge
9. Camp Robinson
10. Woodson-Hensley Water Company – water treatment plant
11. North Pulaski Water Treatment Plant
12. Union Pacific Railroad
13. Pulaski County Sheriff's Office/Building
14. Pulaski County Substations
    a. North-East Substation
    b. North-Central Substation
    c. North-West Substation
    d. South-Central Substation

    e. South-West Substation
15. Pulaski County Special School District
    a. Elementary Schools
        i. Baker
        ii. Cato
        iii. Chenal
        iv. College Station
        v. Crystal Hill
        vi. Daisy Bates
        vii. Harris
        viii. Joe T. Robinson
        ix. Landmark
        x. Lawson
        xi. Oak Grove
        xii. Oakbrooke
        xiii. Pine Forest
        xiv. Sherwood
        xv. Sylvan Hills
        xvi. William Jefferson Clinton
    b. Middle Schools
        i. Joe T. Robinson
        ii. Maumelle
        iii. Mills
        iv. Sylvan Hills
    c. High Schools
        i. Joe T. Robinson
        ii. Maumelle
        iii. Sylvan Hills
        iv. Sylvan Hills High North
        v. Wilbur D. Mills University Studies
16. Wrightsville Prison
17. Pulaski County Courthouse and Administration Building
18. Public Works Facility
19. AWIN Towers
20. VHF simulcast sites


PCSSD - Schools
Public Water Systems
Pulaski Co. Buildings
Pulasi Co. Sheriff's Office
Water Treatment Plants
Water Supply
Bases
Locks & Dams
Bridges
AWIN Towers
Union Pacific Railroad
Co. Detention Facility & Wrightsville Prison
Pipelines
Wrightsville Generating Station
Hospitals
VHF Simulcast Sites
Fire Stations
Google
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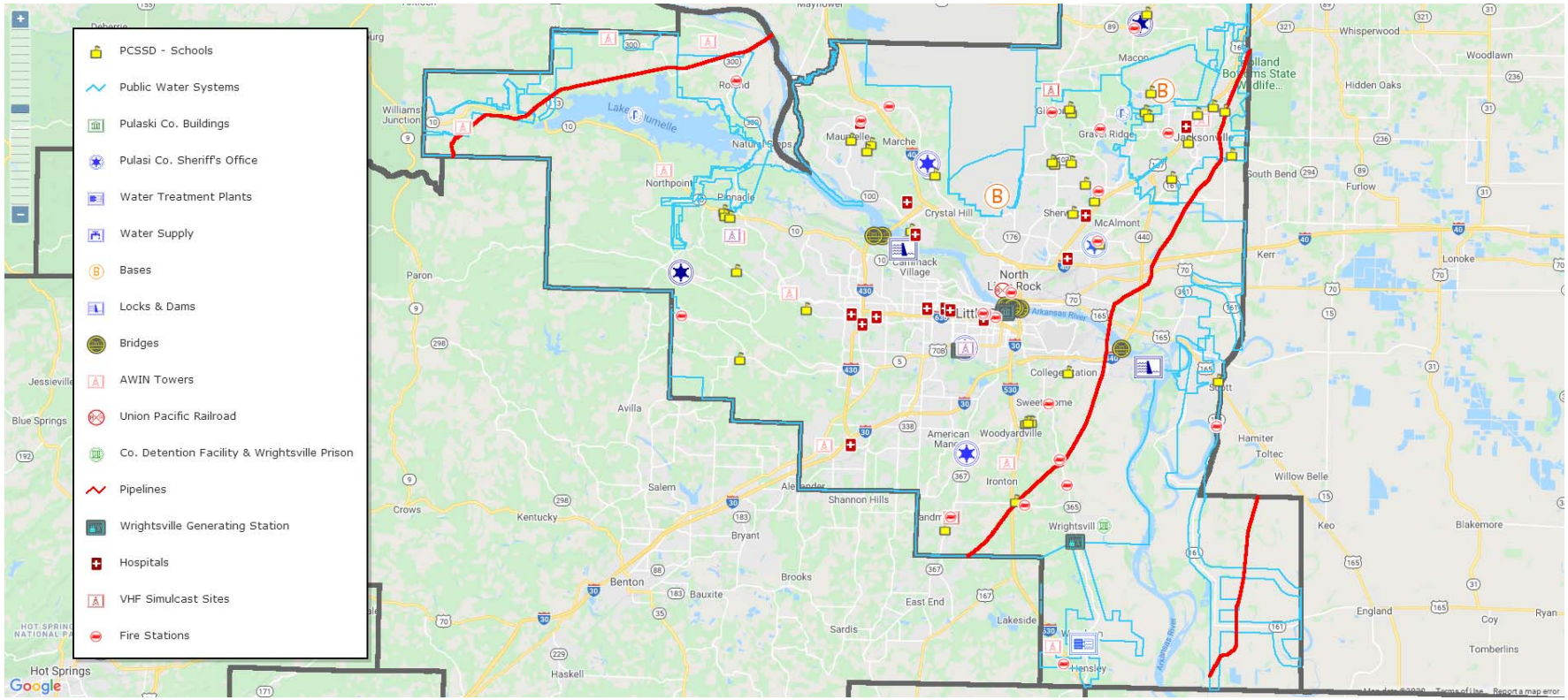
PCSSD - Schools
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Water Treatment Plants
Water Supply
Bases
Locks & Dams
Bridges
AWIN Towers
Union Pacific Railroad
Co. Detention Facility & Wrightsville Prison
Pipelines
Wrightsville Generating Station
Hospitals
VHF Simulcast Sites
Fire Stations
Google

3.2.2 Structure Data

HAZUS Data from the 2018 Arkansas State All-Hazard Mitigation Plan estimates the following Housing growth for Pulaski County as a whole:

Housing Units 2000	Housing Units 205	Percent of Housing Change 200-2015	Mobile Homes 2015	Mobile Home Percent of Housing, 2015
161,135	183,269	13.75%	22,134	6.6%

Closely tracking population data, but tending to lag population changes, housing data is a good indicator of changing state demographics and growth. Over the period of 2000 to 2015 the State of Arkansas has been experiencing a yearly housing increase of 15.49% or 181,719 units. The higher a county's housing stock, the greater the change their hazard vulnerability will increase as well.

3.3 Methodology used in Estimating Potential Loss

The methodology used in this plan for the potential loss estimate was developed by using past hazard events data from The National Climatic Data Center (NCDC) Storm Events Database and the NOAA National Centers for Environmental Information. If information was not able to be obtained of a certain type past hazard event, an estimate of potential loss was not completed due to the lack of information.

3.4 Natural Hazards Affecting Pulaski County

This mitigation plan addresses the natural hazards that can affect Pulaski County, cities of Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood, Wrightsville, and the School Districts Jacksonville-North Pulaski, Little Rock, North Little Rock, Pulaski County Special, Ark. School for the Blind and Arkansas School for the Deaf. The hazards which have affected Pulaski County in the past or could possibly affect in the near future are dam failure, drought, earthquake, extreme heat, flooding, thunderstorms, tornadoes, wildfire, and winter storms.

3.4.1. Dam Failure

According to the Association of State Dam Safety Officials, the term dam is defined in the rules as "any barrier, including one for flood detention, designed to impound liquid volumes." A dam failure is the collapse, breach, or other failure resulting in downstream flooding. A dam impounds water in the upstream area, referred to as the reservoir. The amount of water impounded is measured in acre-ft. An acre-foot is the volume of water that covers an acre of land to a depth of one foot. As a function of upstream topography, even a very small dam may impound or detain many acre-ft. of water. Two factors influence the potential severity of a full or partial dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream.

Low Risk Dams that are private, county or state owned dams not presenting a danger to individuals, structures, residential housing, county roads or state highways will not be addressed in this plan.

According to the Arkansas Natural Resource Commission (ANRC) Title 7, Sections 705.3 – 705.4, the criteria for size classifications are based on height of dam and impoundment capacity, and hazard classifications, which are used in this plan to describe the level of risk and severity associated with dam failure.

Section 705.5 provides detail on the hydrologic criteria for dams based on hazard classification. The classifications are shown in the table below:

Category	Maximum Storage (ac-ft)	Height (Feet)
Small	50 to 1000	25-40
Intermediate	1000 and <50,000	40 and <100
Large	50,000	100

Location

According to the Natural Resource Division, Dam Safety Branch of the Arkansas Department of Agriculture, there are a total of 75 regulated dams throughout the entire Pulaski County planning area. Of these dams, 19 are classified as high hazard dams, 30 are classified as significant hazard dams and 26 are classified as low hazard dams.

NRD PERMIT #	DAM_NAME	ARNUM	LAT_DEG	LON	RIVER_STREAM	AFF_CITY	OWNER	OWNER_TYPE	YEAR_COMP	LENGTH	DAM_HGT	HAZARD
NP	BEALL LAKE DAM	AR00080	34		KELLOGG CREEK-TR	GRAVEL RIDGE	J Johnson and D Beall	P	1952	609	14	H
NP	DAVIS LAKE DAM	AR01226	34		BAYOU METO-TR	JACKSONVILLE	H S Davis	P	1947	540	24	H
NP	FOREMAN LAKE DAM	AR00101	34		GRASSY FLAT CREEK-TR	LITTLE ROCK	William L. Humphries Jr.	P	1962	450	23	H
NP	GREEN LAKE DAM	AR00107	34		MC HENRY CREEK-OS	LITTLE ROCK	James W. Williams(MINOR DEC92)	P	1972	373	25	H
NP	LAKEWOOD LAKE NO 6 DAM	AR00094	34		ARKANSAS RIVER-TR	NORTH LITTLE ROCK	Lakewood Improvement District 4	L	1932	390	22	H
NP	LITTLE INDIAN LAKE NO 1 DAM	AR01232	34		FIVE MILE CREEK-TR	NORTH LITTLE ROCK	Indian Hills Community Club	P	1962	588	27	H
NP	LITTLE INDIAN LAKE NO 2 DAM	AR01233	34		FIVE MILE CREEK-TR	NORTH LITTLE ROCK	Winrock Enterprises	P	1962	530	23	H
NP	SPRICK LAKE DAM	AR00143	34		FOURCHE CREEK OS	LITTLE ROCK	Park Place Baptist Church	P	1930	490	13	H
NP	TODD LAKE DAM	AR00079	34		KELLOGG CREEK-TR	GRAVEL RIDGE	Jerry Rider	P	1940	470	8	H
NP	TWIN LAKES DAM A	AR00106	34		ROCK CREEK-TR	LITTLE ROCK	Twin Lakes 'A' Homeowner Association	P	1950	320	20	H

NP	TWIN LAKES DAM B	AR00110	34		ROCK CREEK	LITTLE ROCK	Twin Lakes Rec. Improvement	P	1964	537	15	H
NP	WINGATE LAKE DAM	AR00138	34		ROCK CREEK-OS	LITTLE ROCK	C V B Developers	P	1941	340	16	H
302	LAKE MAUMELLE DAM	AR00081	34	-92.4869439999999	MAUMELLE CREEK	LITTLE ROCK	Central Arkansas Water	L	1957	2550	65	H
307	JACKSON RESERVOIR DAM	AR00146	34	-92.3702779999999	PUMPED RESERVOIR	LITTLE ROCK	Central Arkansas Water	L	1939	1750	66	H
343	LAKEWOOD LAKE NO. 1 DAM	AR00099	34	-92.239999999999	ARKANSAS RIVER-TR	NORTH LITTLE ROCK	Lakewood Property Owners Association	L	1925	900	29	H
349	SPRING VALLEY LAKE NO 1 DAM	AR00114	34	-92.4394439999999	PAYNE BRANCH	LITTLE ROCK	Spring Valley Manor Suburban Improvement District	P	1965	715	27	H
386	GINGER HILL LAKE DAM	AR01225	34	-92.5533329999999	LITTLE MAUMELLE RIVER-TR	LITTLE ROCK	Anna W. Riggs & John A. Riggs IV	P	1974	572	30	H
485	BROADMOOR LAKE DAM	AR00130	34	-92.343333	COLEMAN CREEK-TR	LITTLE ROCK	Broadmoor P.O.A.	P	1952	625	26	H
516	FLORENCE DAM	AR00122	34	-92.4733329999999	MCHENRY CREEK-TR	MARTINDALE	Lochridge Estates Improvement District No. 703-07	P	1950	450	24	H
NP	ALDERSGATE LAKE DAM	AR00116	34		BRODIE CREEK-TR	LITTLE ROCK	Aldergate Methodist Church	P	1950	239	0	L
NP	ALNETA LAKE DAM	AR00100	34		LITTLE MAUMELLE RIVER-TR	NONE	Tom Starnes	P	1948	290	0	L

NP	BALDWIN LAKE DAM	AR00089	34		KINLEY CREEK	NONE	Phillip Baldwin	P	1960	360	0	L
NP	BIG ROCK SETTLING POND DAM	AR00124	34		FOURCHE CREEK OS	LITTLE ROCK	Big Rock Stone and Material Company	P	1970	7700	0	L
NP	BREDLOW RESERVOIR DAM	AR01224	34		BEAVERDAM BAYOU-TR	NONE	R S Bredlow	P	1960	5200	0	L
NP	BROWN LAKE DAM	AR00073	34		BAYOU METO-TR	NONE	Carl Brown	P	1966	565	18	L
NP	CAMP ROBINSON LAKE DAM NO 1	AR00085	34		FIVEMILE CREEK	NORTH LITTLE ROCK	DOD USA	F	1936	442	0	L
NP	CECIL WHITE LAKE DAM	AR00121	34		FOURCHE CREEK-TR	NONE	S C White	P	1955	511	0	L
NP	COOK LAKE DAM	AR00117	34		BRODIE CREEK-TR	LITTLE ROCK	Cook	P	1962	391	18	L
NP	COULTER LAKE DAM	AR00131	34		LITTLE FOURCHE CREEK-OS	LITTLE ROCK	Crystal Hill Country Club	P	1960	860	22	L
NP	DAILEY LAKE DAM	AR00129	34		FOURCHE CREEK-OS	LITTLE ROCK	Dale Dailey	P	1961	443	0	L
NP	DOUGAN LAKE DAM	AR00090	34		LITTLE MAUMELLE-OS	NONE	Dougan, Mrs	P	1958	350	18	L
NP	EANES MINNOW FARM LAKE DAM NO 1	AR00112	34		DRY BAYOU-TR	SCOTT	A B Eanes	P	1958	1700	0	L
NP	EANES MINNOW FARM LAKE DAM NO 2	AR00111	34		DRY BAYOU-TR	SCOTT	A B Eanes	P	1965	725	0	L
NP	FAULKNER LAKE DAM	AR00069	34		BAYOU METO-TR	NONE	Marvin E Faulkner	P	1956	450	0	L
NP	GREEN BEAR LAKE DAM	AR01218	34		MCHENRY CREEK	LITTLE ROCK	Felix Green	P	1975	972	0	L

NP	GRIBBLE LAKE DAM	AR01228	34		BAYOU METO-TR	NONE	J Gribble	P	1962	720	0	L
NP	GROPPER LAKE DAM	AR00137	34		HARRIS BAYOU	NONE	International Paper Company	P	1938	370	0	L
NP	HARRIS LAKE DAM	AR00097	34		INK BAYOU-TR	NONE	Harris Cattle Company	P	1963	5500	15	L
NP	HUDMANS LAKE DAM NO 1	AR00144	34		NEWTON CREEK OS	NONE	Hudman Estate	P	1930	2700	0	L
NP	HUDMANS LAKE DAM NO 2	AR00145	34		NEWTON CREEK OS	NONE	Hudman Estate	P	1930	550	18	L
NP	JACKSON LAKE DAM	AR00068	34		BAYOU METO-TR	NONE	T E Jackson	P	1950	600	0	L
NP	KIRK LAKE DAM	AR00103	34		ROCK CREEK-TR	LITTLE ROCK	Donald Kirk	P	1958	400	0	L
NP	L D ROGERS LAKE DAM	AR00072	34		PALARM CREEK-OS	NONE	L D Rogers	P	1958	400	0	L
NP	LAKE KUYKENDALL DAM	AR00135	34		CLARK BAYOU	WOODSON	Charles Waldren	P	1963	680	0	L
NP	LOWER SPRING LAKE DAM	AR01220	34		BRODIE CREEK	LITTLE ROCK	Dalme and Malkames	P	1963	310	0	L
NP	MCCONNELL LAKE DAM	AR00093	34		FIVE MILE CREEK-TR	NONE	John Mattews	P	1951	1100	0	L
NP	MILLS VALLEY LAKE DAM	AR01229	34		LITTLE CREEK-TR	NONE	North Pulaski Baptist Association	P	1971	612	21	L
NP	MONTGOMERY LAKE DAM	AR00087	34		NOWLIN CREEK-OS	NONE	J L Montgomery	P	1960	1775	0	L
NP	PLEASANT VALLEY CC LAKE DAM	AR01227	34		GRASSY FLAT CREEK-OS	LITTLE ROCK	Pleasant Valley Country Club	P	1967	1275	17	L
NP	SAM GRAY LAKE DAM	AR00102	34		LITTLE MAUMELLE RIV-OS	NONE	B Gray	P	1952	405	0	L

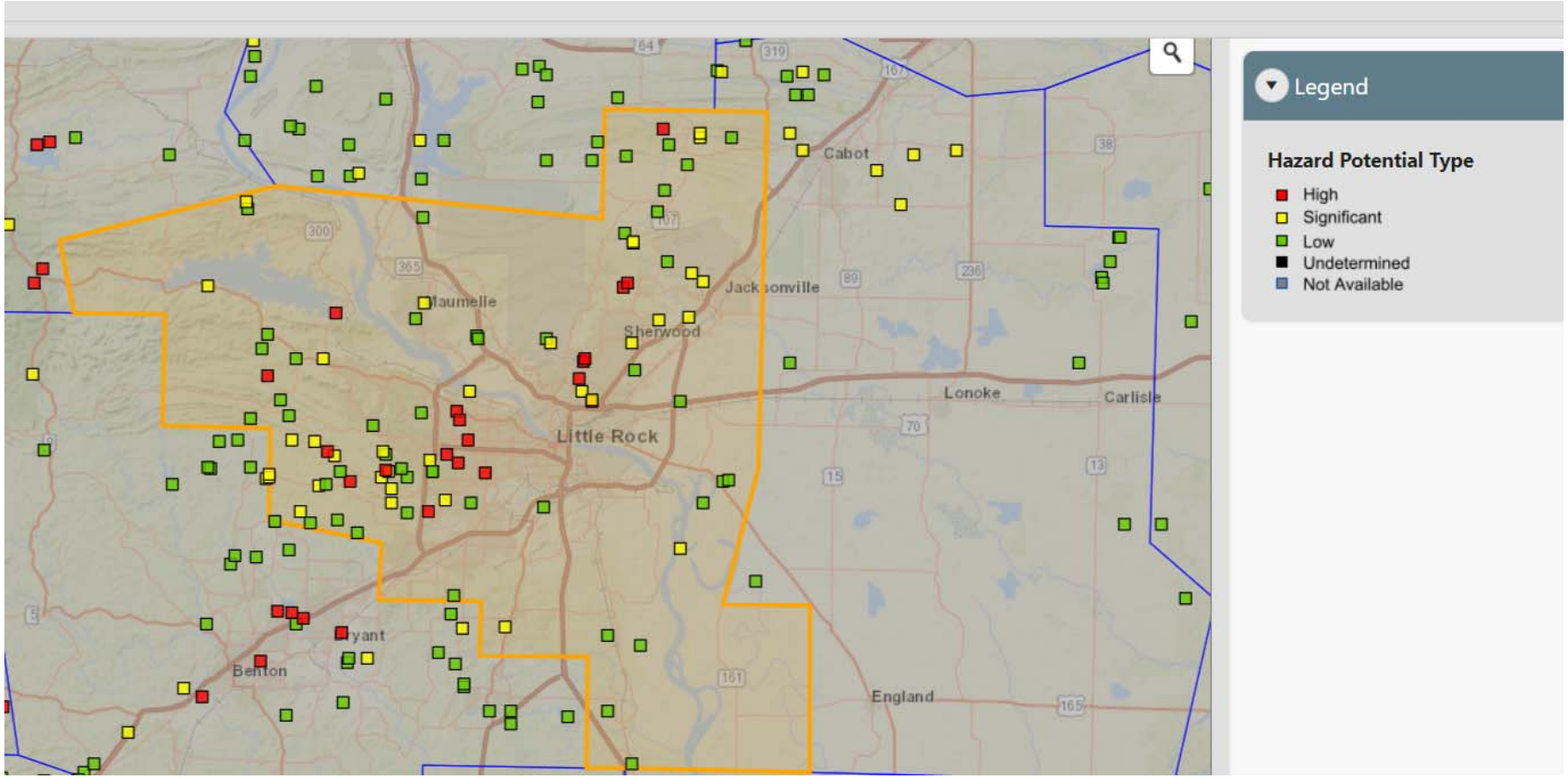
NP	SESSIONS LAKE DAM	AR00070	34		BAYOU METO	NONE	Sessions Mr.	P	1947	508	15	L
NP	THOMAS LAKE DAM	AR00076	34		BAYOU METO-TR	JACKSONVILLE	DOD USAF	F	1958	700	0	L
NP	WALDRON LAKE DAM	AR00136	34		CLEAR CREEK-TR-OS	NONE	Sherman Waldron	P	1948	350	0	L
NP	WALTON LAKE DAM	AR00134	34		FISH CREEK-OS	NONE	Fred Walton	P	1958	380	0	L
NP	WESTERN HILLS LAKE DAM	AR00125	34		FOURCHE CREEK-OS	LITTLE ROCK	City of Little Rock	L	1955	925	24	L
NP	WILLOW BEACH LAKE DAM	AR00127	34		ARKANSAS RIVER-OS	NONE	Floyd Fulkerson	P	1955	1270	0	L
NP	WILSON LAKE DAM	AR00113	34		BRODIE CREEK	LITTLE ROCK	J G Wilson	P	1949	470	17	L
164	4-H LAKE DAM	AR01221	34	-92.569444	FERNDALE CREEK	NONE	Arkansas 4-H Foundation Inc.	P	1979	655	18	L
198	ST. CHARLES LAKE DAM	AR01416	34		ROCK CREEK-TR	LITTLE ROCK	ST Charles Community Association Inc.	L	1979	264	21	L
201	LAKE WILLASTEIN DAM	AR00084	34		ARKANSAS RIVER-TR	NONE	Maumelle SID 500	L	1942	990	20	L
203	SIENNA LAKE DAM	AR00128	34	-92.418333	MC HENRY CREEK-OS	LITTLE ROCK	Cooper Land Development, Inc.	P	1966	234	25	L
204	KEENER'S DAM	AR00139	34	-92.1047219999999	TWO PRAIRIE BAYOU-TR	NONE	G. B. Keener	P	1961	311	25	L
256	ARMSTRONG DAM	AR01459	34		FERNDALE CREEK-TR	FERNDALE	Rush F. Harding	P	1984	400	18	L
281	DAVIDSON LAKE	AR01479	34		ROSS HOLLOW	NONE	Kent Davidson	P		270	20	L
284	MASS, INC.	AR01508	34	-92.4852779999999	FOURCHE CREEK-TR	TERRYTOWN	MASS, INC.	P	1986	600	25	L

464	T.H. MAYER DAM	AR00120	34	-92.418333	BRODIE CREEK TRIB	LITTLE ROCK	Richardson Properties, LLC	P	1967	410	35	L
NP	CAMP ROBINSON LAKE DAM NO 2	AR00086	34		FIVEMILE CREEK	NORTH LITTLE ROCK	DOD USA	F	1936	810	0	S
NP	DAVID D TERRY LOCK AND DAM	AR00172	34		ARKANSAS RIVER	PINE BLUFF	CESWL	F	1968	8700	28	S
NP	DUPREE LAKE DAM	AR00082	34		BAYOU METO-TR	NONE	P W Dupree	P	1960	1300	0	S
NP	GLOVER LAKE DAM	AR01231	34		FOURCHE CREEK-TR	NONE	Dan Glover	P	1970	200	0	S
NP	HATCHER LAKE NO 2 DAM	AR00075	34		BAYOU METO-TR	NONE	Julia Hatcher	P	1945	1032	16	S
NP	HATCHER LAKE NUMBER 1 DAM	AR00074	34		BAYOU METO-TR	NONE	Julia Hatcher	P	1945	520	0	S
NP	INDIANHEAD LAKE DAM	AR00083	34		KELLOGG CREEK-TR	NONE	Indianhead Property Owners Association	P	1963	430	0	S
NP	LAKE CHERRYWOOD DAM	AR00088	34		WOODRUFF CREEK-TR	NONE	Dave Witt	P	1953	856	0	S
NP	LAKE VALENCIA DAM	AR00142	34		WHITE OAK BAYOU-OS	NONE	Maumelle Land Development Company	P	1973	600	0	S
NP	LAMAN LAKE DAM	AR00065	34		BAYOU TWO PRAIRIE	CABOT	W. F. Laman	P	1952	294	20	S
NP	LANDMARK LAKE DAM	AR00132	34		TREADWAY BRANCH NE	NONE	Martin Robinson	P	1957	360	0	S
NP	MURRAY LOCK AND DAM	AR00171	34		ARKANSAS RIVER	LITTLE ROCK	CESWL	F	1969	3740	23	S

NP	PARADISE LAKE DAM	AR00077	34		BAYOU METO-TR	JACKSONVILLE	City of Jacksonville	L	1941	350	10	S
NP	SANDPIPER LAKE DAM	AR01222	34		BRODIE CREEK-OS	LITTLE ROCK	Fauset and Company Realty	P	1970	288	0	S
NP	SPRING LAKE DAM	AR00109	34		BRODIE CREEK	LITTLE ROCK	Dalme and Malkames	P	1968	397	0	S
NP	SPRING VALLEY LAKE NO 2 DAM	AR00118	34		PAYNE BRANCH	LITTLE ROCK	Spring Valley Realty Company	P	1938	647	0	S
NP	STURGIS POND DAM	AR00091	34		LITTLE MAUMELLE RIVER	NONE	Dave Grundfest	P	1956	520	23	S
NP	TALL PINE LAKE DAM	AR00108	34		MCHENRY CREEK-OS	NONE	H D Boyles	P	1959	165	0	S
NP	TALL TIMBER LAKE DAM	AR00141	34		BRODIE CREEK OS	LITTLE ROCK	Pecan Lake Owners Association	P	1925	240	0	S
NP	TRANSVAAL COMPANY LAKE DAM	AR00078	34		ROCKY BRANCH	JACKSONVILLE	Transvaal Inc.	P	1946	520	0	S
313	JABO LAKE DAM	AR00105	34	-92.53	FLETCHER CREEK	NONE	Anne Marsh	P	1946	150	32	S
329	MAUMELLE NURSERY POND DAM	AR01493	34	-92.610833	TWIN CREEK	NONE	Arkansas Game and Fish Commission	S	1989	545	60	S
350	LAKEWOOD LAKE NO. 2 DAM	AR00098	34	-92.2399999999999	DARK HOLLOW DRAIN.-TR	NORTH LITTLE ROCK	Lakewood Improvement District 4	L	1925	620	64	S
351	LAKEWOOD LAKE NO. 3 DAM	AR00095	34	-92.25	ARKANSAS RIVER-TR	NORTH LITTLE ROCK	Lakewood Improvement District 4	L	1925	410	30	S
406	BEGGS LAKE DAM	AR01230	34	-92.5216669999999	PANTHER CREEK-TR	NONE	Marck L Beggs	P	1959	380	30	S
442	WILKINS LAKE DAM	AR00066	34	-92.135	BAYOU TWO PRAIRIE-TR	CABOT	Dennis Wilkins	P	1952	253	30	S

447	KOBAN LAKE DAM	AR00126	34	-92.433333	MC HENRY CREEK-OS	LITTLE ROCK	Koban Family, LLC	P	1961	360	29	S
463	LAKE NIXON DAM	AR00123	34	-92.433333	MC HENRY CREEK TRIB	LITTLE ROCK	Second Baptist Church	P	1946	246	35	S
470	LAKE PATRICIA DAM	AR00119	34	-92.4433329999999	MC HENRY CREEK TRIB	LITTLE ROCK	Jan Woods	P	1946	552	27	S
496	FERNCREST DAM	AR01536	34	-92.5080559999999	FLETCHER CREEK TRIB.	NONE	Andrea Rockefeller	P	2000	425	57	S
NP	BROOKS POND DAM	AR01606	35		BOYD BRANCH - TR	NONE					7.2	U
NP	GLOVER DAM	AR01564	34		FOURCHE CREEK-TR		Judy Glover	P				U
241	SMITH LAKE	AR00000	0				Sam Smith	P		0	0	U
	*NP=Not permitted by NRD (ANRC) and does not meet threshold requiring a permit. Federally owned dams are regulated by the feds.											

Location of Permitted Dams in Pulaski County as provided by National Inventory of Dams (nid.sec.usace.army.mil)



Extent

The following calculations do not reflect the physical conditions of the dams, but rather describe areas downstream of the dams that could be impacted in the event of failure. According to ANRC Title 7, the rate of risk for dam failure is calculated as follows:

Low Hazard Dams	No loss of life and minimal economic loss are expected. (No significant structures, pastures, woodland, or largely undeveloped land); less than $ 100,000.
Significant Hazard Dams	Loss of life is possible, but not expected. Economic loss would be appreciable. (Significant structures, industrial, or commercial development, or cropland); $100,000 to $500,000.
High Hazard Dams	Loss of life is expected, and economic damage would be excessive. (Extensive public, industrial, commercial, or agricultural development); over $500,000.

The HMPT cites a data deficiency related to extent, as there is currently no data available to indicate inundation areas, potential flood depths, volume of water or arrival times for a dam failure in Pulaski County.

Previous Occurrences

There are no documented previous occurrences of dam failure in Pulaski County.

Probability of Future Events

Because there are no known dam failures to have occurred in Pulaski County, it is not possible to predict a future event using the Poisson probability equation. All of the dams were constructed between 1913 and 1970. Regular inspection and maintenance will circumvent future events. Based upon having no historic events, the probability is less than 1% in any given year that a future dam failure will occur.

Impact and Vulnerability

According to the 2018 Arkansas Hazard Mitigation Plan, the state described vulnerability in terms of the jurisdictions most threatened by dam failure, points were assigned to each type of dam and then aggregated for a total point score. Points were assigned as follows for each dam:

- Low Hazard Dams, 1 point
- Significant Hazard Dams, 2 points
- High Hazard Dams, 3 points
- High Hazard Dams without EAP, an additional 2 points

The State's analysis did not intend to demonstrate vulnerability in terms of dam structures that are likely to fail, but rather provided a general overview of the counties that have a high number of dams, with a weighted consideration given to dams whose failure would result in greater damages. The table below identifies dam failure vulnerability in Pulaski County. According to the State Hazard Mitigation Plan, Pulaski County dam vulnerability rating far exceeds other counties in the state, partially because Pulaski County has nearly four to five times more dams, plus the number of high hazard dams is significantly higher than other Arkansas Counties.

County	# Low Hazard Dams (x1 point)	# of Significant Hazard Dams (x 2 points)	# of High Hazard Dams (x 3 points)	# of Low Hazard Dams w/o EAP (x2 points)	Weighted Vulnerability Score
Pulaski	5	10	7	3	163

The Arkansas State Hazard Mitigation Plan (2018) uses the following formula to estimate losses:

$500,000 High Hazard Dams

$250,000 Significant Hazard Dams

$50,000 Low Hazard Dams

Expected Damages	High Hazard	Significant Hazard	Low Hazard
	$13,000,000	7,500,000	$950,000

Dam failure risk in the Pulaski County Planning Area varies considerably by jurisdiction. Refer below for a description of each jurisdiction's exposure to dam failure events. To accurately determine the spatial extent of potential flood inundation areas for each high risk dam would require a detailed engineering study; however, for each high risk dam, the HMPT reviewed topographic maps and land use in the downstream area. Due to the lack of "engineering data" and the primary scope of effort of the intent of the HMP Update, the HMPT decided to limit its assessment of dams to high risk dams. As reflected in the comments below relative to dams with a hazard level classified as high, the impacts resulting from dam failure occurring to dams classified as Significant, the impacts would be less. Exactly what the impacts would be are relative to each dam and the area downstream. A case by case assessment would need to be completed, but overall it can be said impacts to residential structures would most likely be the result of dam failure. Most likely there would be some impact to commercial; however, it does not appear that any local jurisdiction's facilities would be adversely affected. As indicated earlier in the text as inundation data becomes available between now and the next update, the HMPT working with the ANRC, will work to update dam vulnerability based on concrete engineering data. *The following information is derived from the previous Pulaski County Mitigation Plan.*

Alexander: The City of Alexander is **Not at Risk** from a dam failure event. No dams are located within or upstream from the City of Alexander.

Cammack Village: Cammack Village is at **Not at Risk** from a dam failure event. No dams

are located within or upstream from the City of Cammack Village.

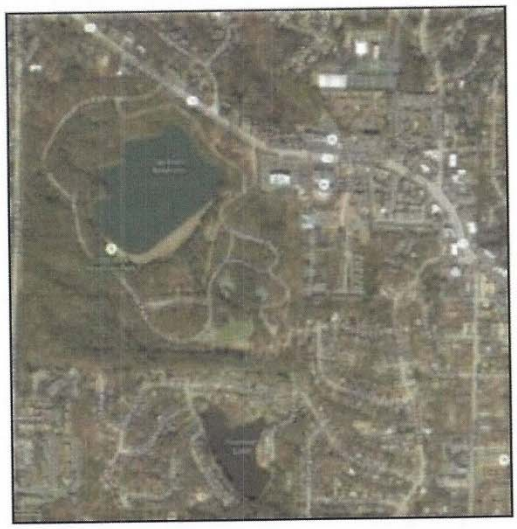
Jacksonville: The City of Jacksonville is **Not at Risk** from a dam failure event. There are three dams shown as being located in the City; however Davis Lake Dam, it is located west of the Jacksonville city boundaries. Therefore, a discussion of Davis Lake Dam is found in the unincorporated Pulaski County section that follows.

Little Rock: The City of Little Rock is at **Moderate Risk** from a dam failure event. There are 24 dams located within the City of Little Rock. There are 8 high hazard class dams located within the City of Little Rock. Refer to the maps below for a discussion regarding a dam failure including Broadmoor Lake Dam, Foreman Lake Dam, Jackson Reservoir Dam, Sprick Lake Dam, Spring Valley Lake No. 1 Dam, Twin Lakes Dam A, Twin Lakes Dam B, and Wingate Lake Dam. Note that the black arrow on the figures indicates an approximation of direction flow of water. Three of the high hazard class dams hold significant water volume (greater than 100 acre/feet) that could flood substantial acreages of land during a dam failure event, Jackson Reservoir Dam, Twin Lakes Dam A, and Spring Valley Lake No. l. Broadmoor Lake Dam, Wingate Lake Dam, and the Twin Lake Dam cause concern since each dam is within close proximity of major institutional and/or commercial centers. They include University of Arkansas at Little Rock, Baptist Health Hospital, and Brady Elementary School. If any of the three dams failed, the surrounding neighborhoods would most likely sustain substantial damage not only to property but also to individuals impacted by the flood inundation

Jackson Reservoir Dam and Foreman Lake Dam

The Broadmoor Lake Dam is 26 acre-feet in height and holds a volume of 80 acre-feet. Dense population development located near high hazard class dams poses a significant risk in the City of Little Rock. The University District, a redevelopment area, is located within a quarter-mile radius of Broadmoor Lake Dam. The University District houses approximately 10,000 people and employs over 7,000 people, as well as educates 12,000 students at the University of Arkansas at Little Rock. In addition there are a number of commercial centers located on South University Avenue. Also, approximately 3,000 feet south of the Broadmoor Dam is a major intersection where State Road 5, S. University Avenue and U.S. 67 converge. A dam failure event in this area could be catastrophic.

Sprick Lake Dam



Jackson Reservoir

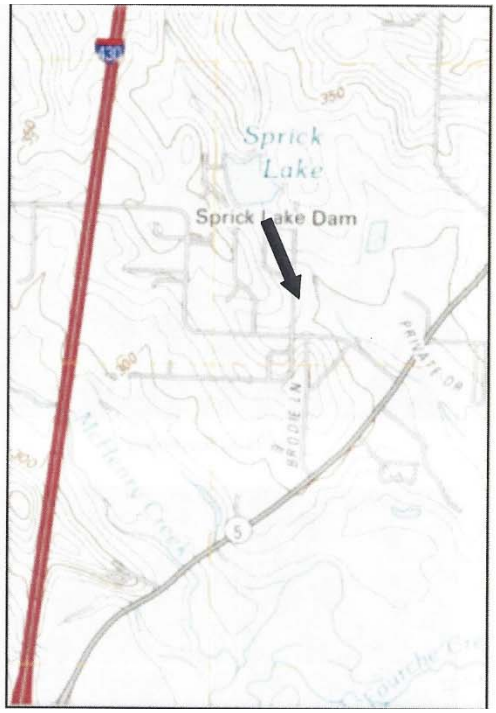
Foreman Lake Dam

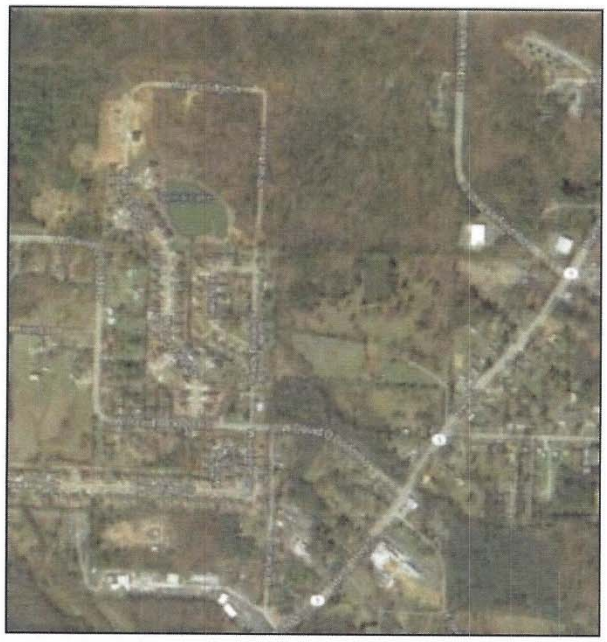
<u>Jackson Reservoir:</u> Besides being an important recreational asset to Little Rock, the Jackson Reservoir also serves as an auxiliary potable water source for Central Arkansas Water which is the potable water service provider for Pulaski County and surrounding

counties. The Jackson Reservoir Dam has a height of 66 feet and holds a volume of 353 acre-feet. The reservoir drains south where it finally reaches
Rock Creek. The Sheraton Park, a low density residential neighborhood, would be the area that would most likely sustain extensive damage should the Reservoir dam be breached.

Foreman Lake Dam: The Foreman Lake is a central physical feature within the Lake Foreman Preservation Society neighborhood. The reservoir drains in a southerly direction into the Grassy Flat Creek. The dam is 23 feet in height and holds a volume of69 acre-feet of water. Should the dam breach the water would flow south through a restricted stream channel flowing ultimately flowing into Rock Creek. The area south of the dam consists of primarily single family residences.

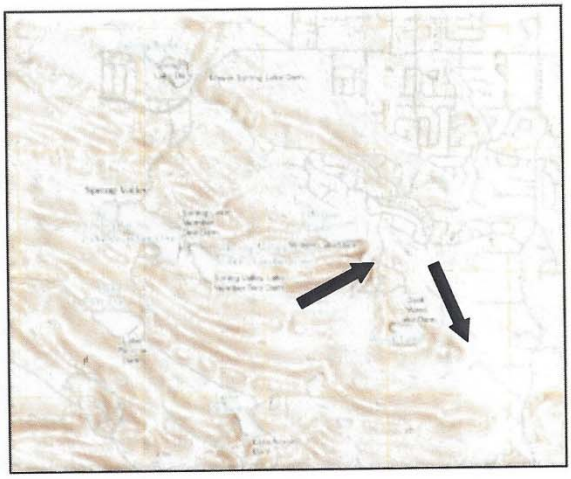
Sprick Lake Dam





Situated in southwest Little Rock, Sprick Lake Dam is located east of lnterstate 430, just north of David O. Dodd Road. The dam is 13 feet in height and contains 52 acre-feet of water. Sprick Lake drains in a southerly direction into the Fourche Creek. Immediately adjacent to the dam is a small 36 lot residential subdivision known as Shady Brook. It was built in 1946. Once the tributary leading from Sprick Lake passes through the Shady Brook Subdivision, it flows through a natural stream corridor until it reaches the Fourche Creek.

Spring Valley Lake Dam #1

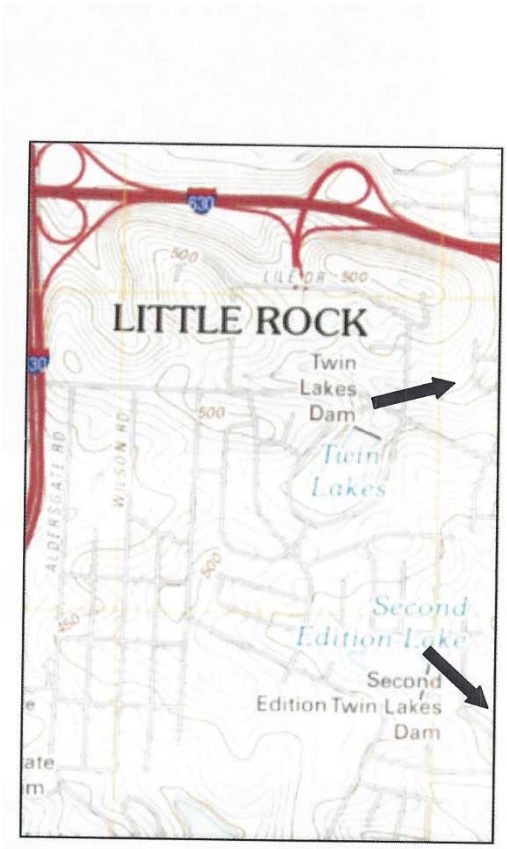


Spring Valley Lake Dam is located 8.5 miles west of downtown Little Rock. The dam is 27 feet in height and contains 156 acre feet of water. The lake is surrounded by residential development; however, discharge from the lake flows into the Payne Reach which ultimately is connected to Bodie Creek. The banks of Payne Reach leading from the dam to Brodie Creek is steep with scattered development. This dam meets the criteria that requires this dam be permitted by the Arkansas Natural Resources Commission which is managed by the Dam Safety and Flood Management Division.

Wingate Lake Dam

Located at the northwest corner of Markham and Mississippi Avenue, Wingate Lake Dam is 16 feet in height and holds back 57 acre-feet of water. If a breach occurred, water would flow south impacting several nearby neighborhoods, Markham Manor and Fair Hills subdivisions. The downstream flow originating from a breach of the dam would cause significant damage along the stream corridor before it reaches Rock Creek. In addition to residential development, the Brady Elementary School is within
±300 feet of Lake and could potentially be damaged by a breach to the dam in addition to Markham Road, a major east-west roadway in Little Rock.

Twin Lakes Dam



Twin Lakes Dam

Second Twin Lakes Dam

Twin Lakes Dam is a major facility. It is 20 feet in height and holds 188 acre-feet of water. If a breach occurred water would flow north ultimately reaching Rock Creek. Baptist Health Hospital Medical Center, a major medical facility serving the greater Little Rock area for over 80 years is situated immediately north of the dam in the projected area of inundation. Also within the potential floodway are two residential neighborhoods, Patton Place and Longacre Place. Also potentially impacted could be the Baptist Day Care Center on Barrow Road.

Second Twin Lake Dam is 15 feet in high and holds back 34 acre-feet of water. If breached water would flow in a southeasterly direction and ultimately empty into Rock Creek. Water moving downstream would impact primarily older stable residential neighborhoods such as the Twin Lakes Subdivision which is immediately south of Second Twin Lake. These are urban neighborhoods averaging 4 units per acre.

There are also 5 significant hazard class dams and 11 low hazard class dams within the City of Little Rock.

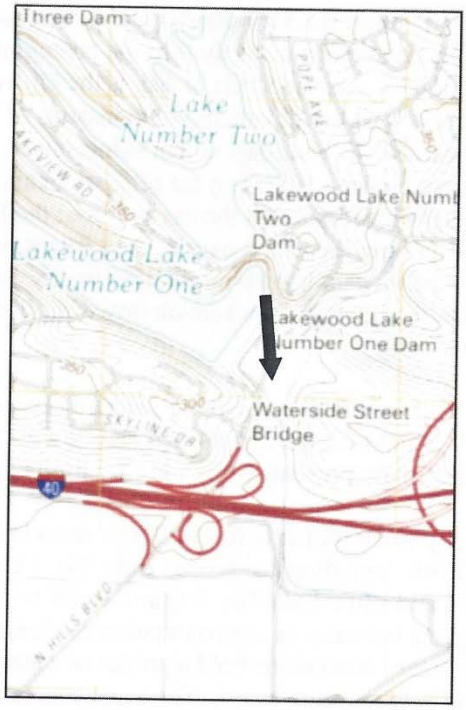
Little Rock School District/UALR: The 24 dams located in the City of Little Rock. The HMPT reviewed the location of schools relative to the location of the 24 dams located in the City of Little Rock. The Brady School located on W. Markham Avenue is located within several hundred feet of Wingate Lake Dam; therefore, may potentially be at risk should a dam failure occur. Only through an engineering study could any definitive answer be determined. The major educational facility at risk is the University of Arkansas at Little Rock (UALR). With a 13,000 student body, every day there are thousands of students as well as staff on campus. UALR sits on 150 acres with 40 buildings which is located on University Boulevard, immediately east of the Broadmoor Lake Dam. Knowing the relative location of school facilities relative to existing dams the HMPT has determined that with the exception of the Brady School and UALR, there is little risk to schools from a dam failure; therefore, overall the Little Rock School District is at **Low Risk** from a dam failure event. While a dam breach might not directly damage a school facility, it certainly might affect the transport of children to and from school; however, in the future the HMPT will evaluate the need to undertake such a study.

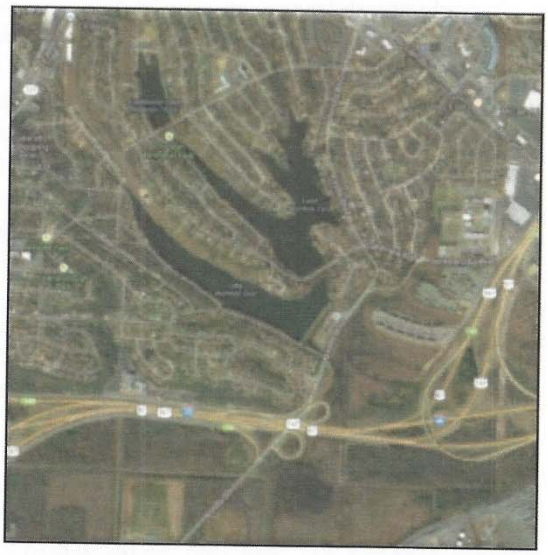
Maumelle: The City of Maumelle is at **Low Risk** from a dam failure event. No high hazard class dams are located within or upstream from the City of Maumelle. One low hazard permitted dam (Lake Willastein Dam) and one non-permitted significant hazard dam are present within the City limits.

North Little Rock: There are 6 dams located within the City of North Little Rock. There are 4 high hazard class dams located within the City of North Little Rock, including Lakewood Lake No. 1 Dam, Lakewood Lake No. 6 Dam, Little Indian Lake No. 1 Dam, and Little Lake No. 2 Dam. Refer to **Figures 3.40 to 3.42.** Note that the black arrow on the figures indicates an approximation of direction flow of water. Each is described below. Two of the high hazard class dams hold significant water volume that could flood substantial acreages of land during a dam failure event. The Lakewood Lake No. 1 Dam has a height of29 feet and holds a volume of 378 acre-feet. The Lakewood Lake No. 6 Dam has a height of 22 feet and holds a volume of 84 acre-feet.

Residential development located near high hazard class dams is a significant risk in the City of North Little Rock. According to the Lakewood Property Owners' Association, there are numerous residential structures that have been developed along the banks of the Lakewood Lake No. 1. In the event this dam would fail this area could sustain significant flood damage.

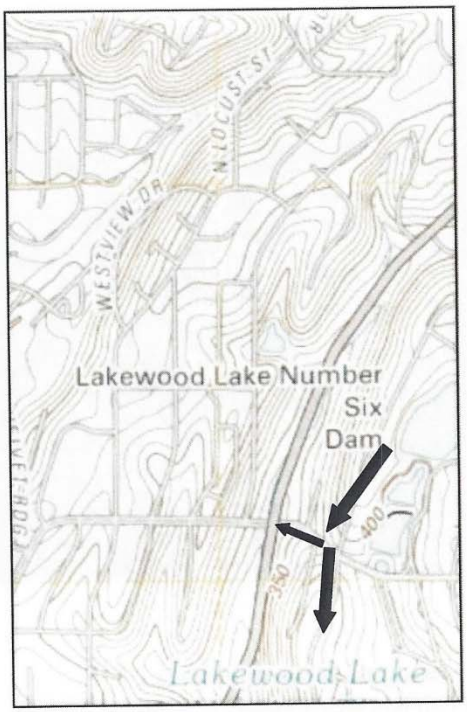
Lakewood Lake Number One Dam

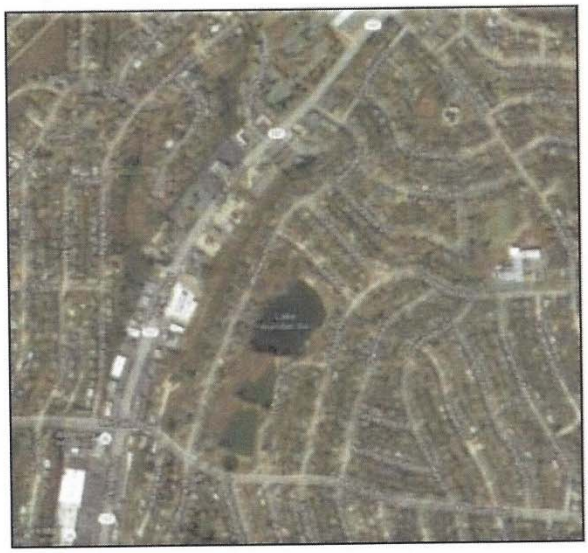




The Lakewood Number One Dam is located in North Little Rock just north of lnterstate 40 and west of
U.S. 67. The dam is 29 feet in height. The lake holds 378 acre-feet which is substantially above the state criteria of 50 acre feet or greater for a high risk dam. Much of the downstream area is either in timber or pasture; however, located within the potential flood area is the Union Pacific's 300 acre rail yard complex that contains the Union Pacific's largest locomotive maintenance center and heavy repair shop. In addition Interstate 40 a major east-west corridor is situated within the potential floodway.

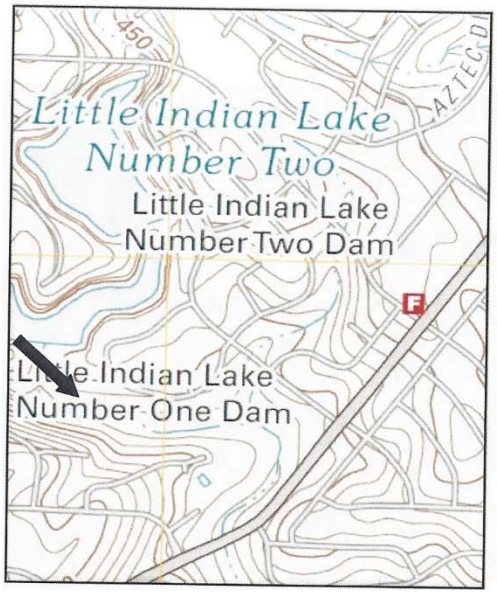
Lakewood Lake Number Six Dam

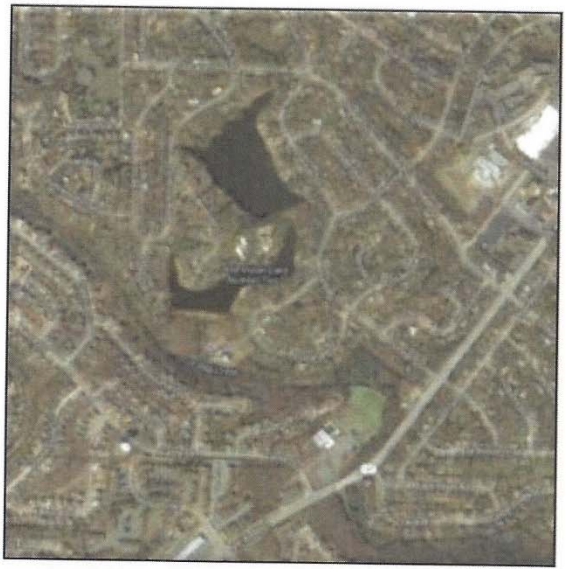




The Lakewood Lake No. 6 Dam is located on a ridge east of JFK Boulevard and north of McCain Boulevard. The impoundment holds 84 acre feet of water. The dam is 22 feet in height. Immediately south of Lakewood Lake No.6 are a series of smaller lakes which appear to be 20 to 30 feet higher. The area immediately surrounding the lake is residential. However, without a specific engineering study, it is difficult to tell whether a breach in the dam would result in water flowing west and inundating the
JFK Boulevard area which is a significant commercial corridor in North Little Rock.

Little Indian Lake Number One and Number Two Dams





Little Indian Lake Number One and Two are located on the north side of North Little Rock, approximately one-half mile northwest of JFK Boulevard. Dam Number One has a height of 27 feet. The reservoir has 41 acre-feet of water. Dam Number two is 23 feet high and 57 acre feet of water. The discharge from the two lakes heads in a southerly direction and feeds into Five Mile Creek. The downstream areas for both Lakes is Based on the topographic map, it appears that if there were a breach in Little Indian Lake Number Two Dam, potentially it could cause a breach in Little Indian Lake Number One (engineering study required to make any definitive conclusion). In the floodway of Little Indian Lake Number One Dam is a recreational complex for the Indian Hills development.
JFK Boulevard also sustain damage from a breach since Five Mile Creek passes under the roadway.

There are also 2 significant hazard class dams within the City of North Little Rock. Both significant hazard dams are located near developed areas and could cause some structural damage in the event of a dam failure. The City of North Little Rock is at **Severe Risk** from a dam failure event.

North Little Rock School District: The HMPT reviewed the location of schools relative to the location of the 6 dams located in the City of North Little Rock. No school is within close proximity of any of the dams. While a dam breach might not directly damage a school facility, it certainly might affect the transport of children to and from school. The HMPT will evaluate whether a study is necessary to assess the impact on school operations should a dam breach. Therefore at this time the potential of dam failure to the North Little Rock School District is minimal. At this time, the North Little Rock School District is at **Low Risk** from a dam failure event.

Pulaski County Special School District: There are 62 dams located within Unincorporated

Pulaski County and upstream dams could pose a significant risk to the Pulaski County Special School District; however, that would only be the case if a school was located nearby to a breached dam. Until an investigation is conducted by the HMPT assumes that the Pulaski County School District is at **Low Risk** from a dam failure event.

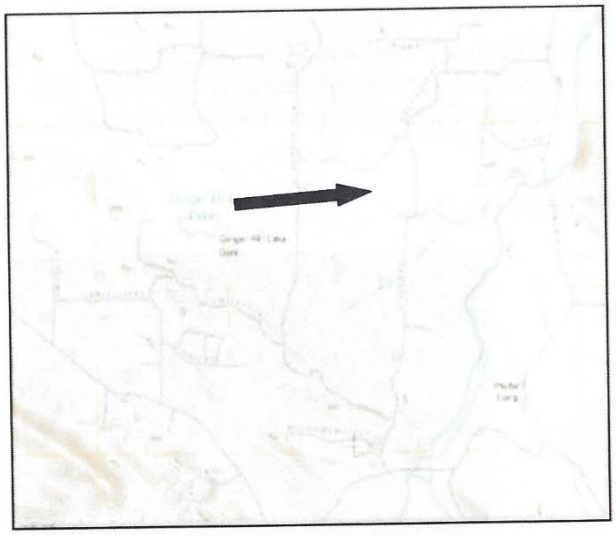
Sherwood: The City of Sherwood is at **Low Risk** from a dam failure event. No high hazard class dams are located within or upstream from the City of Sherwood. Two non-permitted significant hazard dams are present within the City limits.

Wrightsville: The City of Wrightsville is at **Low Risk** from a dam failure event. No high or significant hazard class dams are located within or upstream from the City of Wrightsville. One non-permitted low hazard class dam is located just south of the City, but does not pose any significant threat.

Unincorporated Pulaski County: There are 62 dams located within Unincorporated Pulaski County. There are 4 high hazard class dams located within Unincorporated Pulaski County, including Ginger Hill Lake Dam, Green Lake Dam, Todd Lake Dam, Lake Florence Dam, and Davis Lake Dam. Refer to **Figures 3.43 to 3.47.** Note that the black arrow on the figures indicates an approximation of direction flow of water.

There are also 22 significant hazard class dams and 35 low hazard class dams within Unincorporated Pulaski County. Some of the significant hazard dams are located near developed areas and could cause some structural damage in the event of a dam failure. Unincorporated Pulaski County is at **Severe Risk** from a dam failure event.

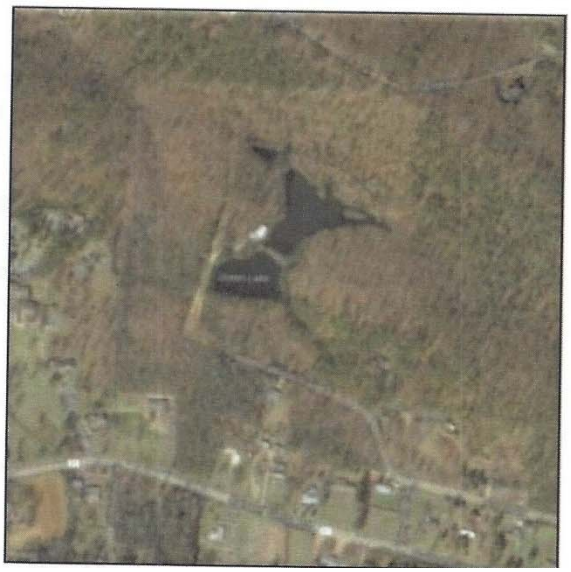
Ginger Hill Lake Dam



The Ginger Hill Lake Dam is approximately 18 miles west of downtown Little Rock. This is a rural, rugged mountainous area. This is one of the permitted high hazard dams permitted

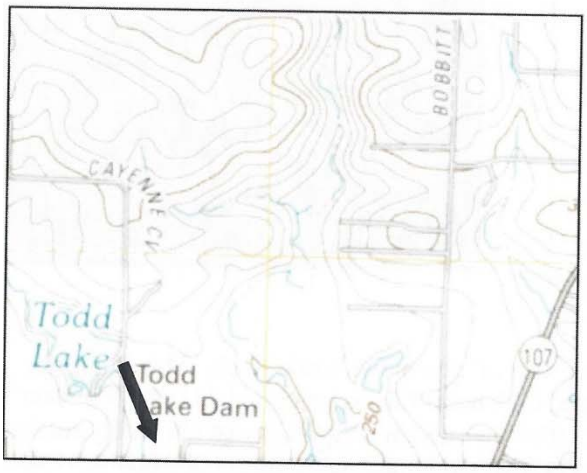
ADNR. The dam is 30 feet high and the lake has 120 acre-feet of water. It's downstream area flows east ultimately reaching the Little Maumelle River. Should a dam breach occur it would impact some scattered structures existing the floodway.

Green Lake Dam



Located approximately 16 miles west of Little Rock situated in the Ouachita Mountains, is the Green Lake Dam. This high hazard dam is 25 feet in height and impounds 75 acre-feet of water. The lake discharges into McHenry Creek. This area is very rural with scattered residential development downstream of the dam.

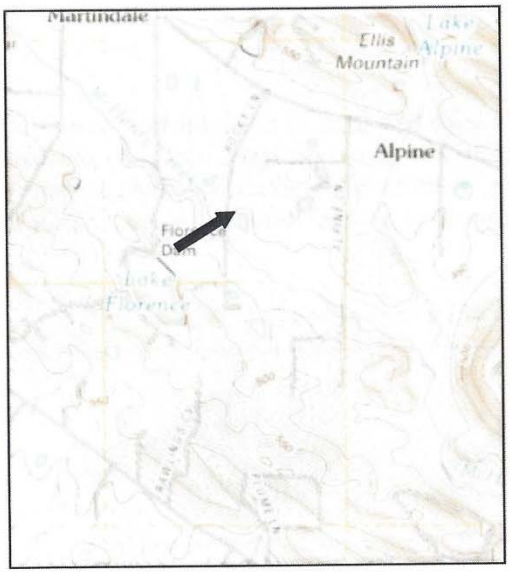
Todd Lake Dam



Todd Lake Dam is located in northern Pulaski County approximately 8 miles west of the

City of Jacksonville. The dam is 8 feet high and holds back 178 acre-feet of water. The downstream area from the dam has minimal development and population; therefore, the potential for damage is relatively minimal. There is only one development, Creek Dale, an older subdivision of 80 units, located southeast of Todd Lake Dam that might possibly be exposed to damage resulting from a breach in the dam. Water from a breach would flow southward into Kellogg Creek.

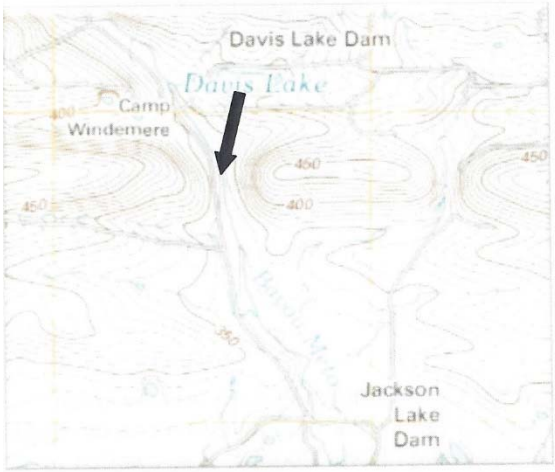
Lake Florence Dam



The Lake Florence Dam is roughly 13 miles west of downtown Little Rock in the Ouachita Mountains. The dam is 24 feet in eight and impounds 135 acre-feet of water. The water would discharge northeast toward McHenry Creek. The downstream area is characterized by large lot (5 Acre) scattered rural residential development

Davis Lake Dam

Figure 3.47 Davis Lake Dam



Davis Lake Dam has a height of 25 feet and holds a volume of 53 acre feet. It is located in an area with minimal population and few structures within proximity of the Lake. Based on the topo and aerial above, if the Davis Lake Dam failed it would cause minimal structural damage and human life loss.

Levees

FEMA defines a levee as a man-made structure that helps contain or control the flow of water during a flood. When discussing levees, there are many terms and definitions that can mean different things to different people. Here are a few terms related to levees and their U.S. Army Corps of Engineers' definition.

Breach: A rupture, break or gap whose cause has not been determined.

Corps authority: There is no single agency with responsibility for levee oversight nationwide. The Corps has specific and limited authorities for approximately 2,000 levees nationwide.

Corps rehabilitation funding eligibility: Federally authorized and some non-federal levees may be eligible for Corps rehabilitation assistance funding if certain criteria are met.

Failure breach: A breach for which a cause of failure is known based on an investigation to determine the cause.

Levee: An earthen embankment, floodwall, or structure along a water course whose purpose is flood risk reduction or water conveyance.

Levee certification: Process under the national Flood Insurance Program used to determine how the Federal Emergency Management Agency (FEMA) will map the floodplain behind a given levee system. Certification documentation is the responsibility of the local project sponsor.

Levee types:

- Federally authorized levee: Typically designed and built by the Corps in cooperation with a local sponsor then turned over to a local sponsor to operate, maintain, repair and replace the levee.
- Non-federally authorized levee: Designed and built by a non-federal agency, which is responsible for the operation, maintenance, repair and replacement of the levee.
- Private or corporate-owned levee: Designed and built by a private citizen, company or other public entity, which is responsible for the operation, maintenance, repair and replacement of the levee. The Corps has no responsibility for private or corporate-owned levees.

Local responsibility: The responsibilities of local levee partners are broad and include levee safety; land use planning and development; building codes and operations, maintenance, repair, rehabilitation and replacement of the levee.

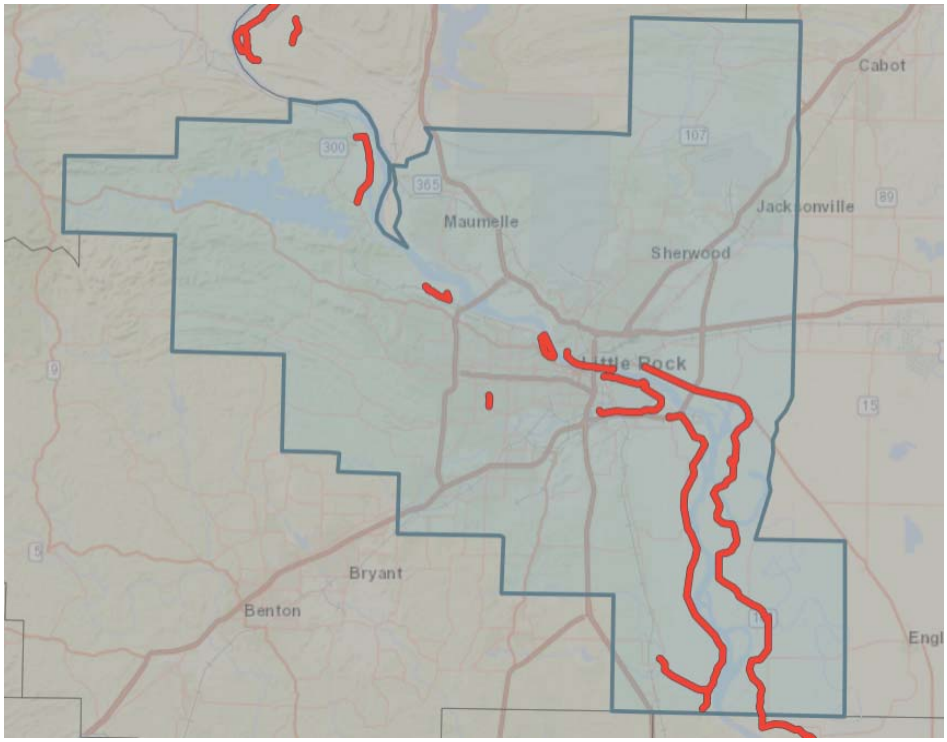
Overtopping: Water levels exceed the crest elevation of a levee and flow into protected areas. Levee may be damaged but not compromised. Flooding occurs from overflow/overwash (waves) and other sources.

Overtopping breach: A breach whose cause is known to be a result of overtopping (system exceeded). The levee has been compromised after overtopping and must be repaired to function prior to the next event.

Pulaski County has 9 levee systems, 69 miles of levees, 106 levee structures and the average levee age is 71 years.

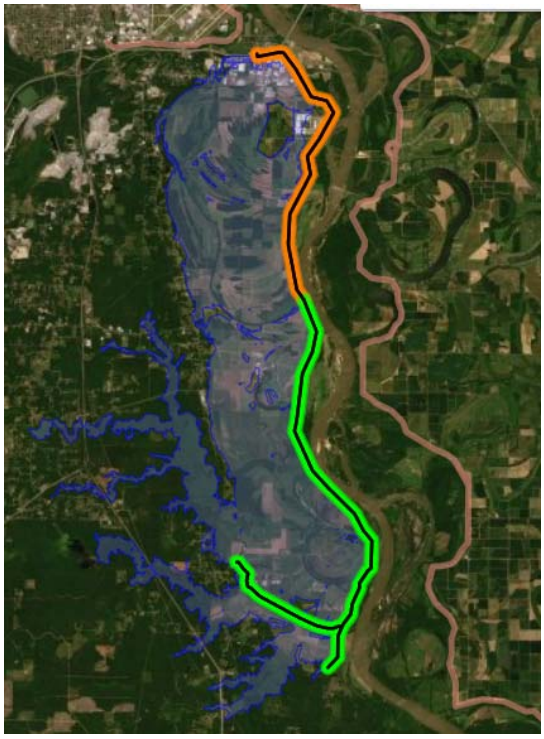
Location

As seen in the location map below, seven of the levees are directly in relation to the Arkansas River. The information provided came from the National Levee Database.



The following pages will include the location of each levee (including segments), with a brief description and Risk Assessment of each.

The Head of Fourche Island to Pennington Bayou Levee (Segments: Woodson Levee District – Orange & Fourche Island Drainage District #2 – Green)



Project Description:

The Head of Fourche Island to Pennington Bayou Local Flood Project is a federally authorized non- federally operated and maintained flood risk management project. The Fourche Island Drainage District No. 2 and the Woodson Levee District are segments of the larger Head of Fourche Island to Pennington Bayou Local Flood Project which primarily serves as flood damage reduction for approximately 21,580 acres consisting of rural lands including homes, businesses and agricultural areas in Pulaski County, Arkansas. Construction of the levee system began on July 23, 1947, and was completed on May 8, 1952. The levee system was originally authorized by the Flood Control Act approved August 18, 1941, and modified by the Flood Control Act approved December 22, 1944 (Public Law No. 534, 78th Congress, 2nd Session). The Head of Fourche Island to Pennington Bayou Local Flood Project is located on the right bank of the Arkansas River in Pulaski County, Arkansas, beginning at a point approximately nine miles south of College Station, Arkansas, and extending downstream to high ground at a point about three miles east of Hensley, Arkansas. The total length of the levee system is about 19 miles. The embankment averages about 15 feet in height and has a crown width of 10 feet with slopes of 1V:3H on both the landside and riverside. The Fourche Island Drainage District No. 2 is the upstream most levee segment, starting at Station 0+00 and ending at Station 471+33. The Fourche Island Drainage District No. 2 system is an 8.9 miles earthen levee, it contains two closure structures, and four drainage structures. The Woodson Levee District starts at Station 471+33 and continues downstream to Station 1010+65. The Woodson Levee District system includes 10.2 miles of earthen levee and four drainage structures along the Arkansas River.

Risk Assessment:

The Fourche Island Drainage District No. 2 has a well-established active board and is accredited by FEMA and the risk associated with the levee considered low. The Woodson Levee District does not have an active board to perform required operations and maintenance work, thus there are many years of neglected maintenance. As a result, the Woodson levee has deficiencies that may hinder its ability to protect against a major flood therefore the risk associated with the levee is considered high. Because the two levee segments are part of a larger levee system, they depend on each other to reduce flood risk to lives and property behind the levee system. Thus, the condition of the Woodson Levee prevents the Head of Fourche Island to Pennington Bayou Local Flood Project from functioning as it was originally intended, therefore the levee system is considered a high risk. It is imperative that a public sponsor be put in place to correct the deficiencies and perform operations and maintenance tasks required to ensure a properly functioning levee system.

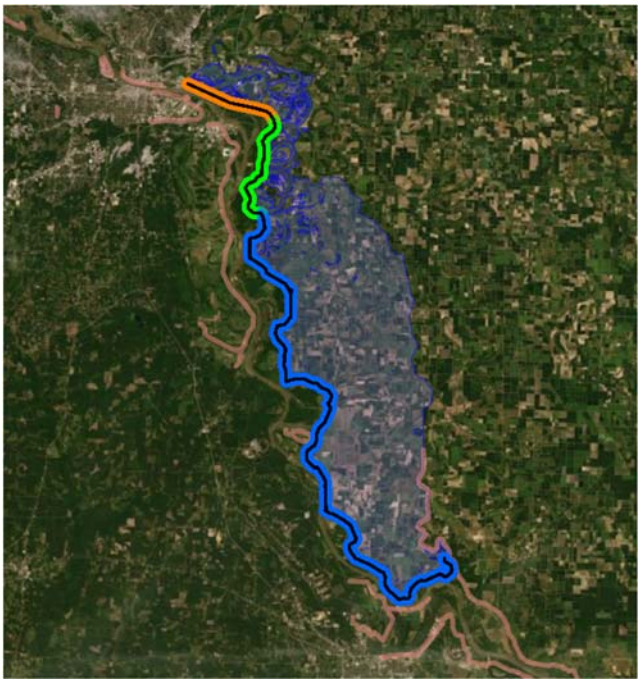
The Local Flood Project primarily serves as flood risk management for homes, businesses and agricultural areas in Pulaski County, Arkansas. It also serves as flood risk management to the Arkansas Department of Corrections Wrightsville Prison which house 1300 inmates at the prisons as well a staff of 150 people and the Little Rock Port Authority. These entities within the

leveed area of the project place high importance that an active board is in place to administer the Woodson levee. Recently passed state legislation gives the authority to appoint levee board members to the county judge. Meetings with all stakeholders to discuss the roles of the board, those living behind the levee and the Corps will be very important in reestablishing the Woodson Levee District. Once the Woodson District has been reestablished, the Corps will assist the district to become active in the Rehabilitation Inspection Program (RIP) and inform the district the benefits of being active in the RIP. The Corps will assist the district to develop a System-Wide Improvement Framework (SWIF) so that the district becomes active as soon as possible.

It is important that actions be taken for all structural deficiencies noted below but to further reduce the risk of living behind the levee, it is also important that the sponsor, along with the county/city officials and the community develop an emergency action and evacuation plan. This plan should include but not be limited to, designated river stages to set into action inspections, closure of culvert gates and closure of the road crossings. The plan should also include designated evacuation routes and river stages to execute the evacuation. It should be noted that these designated action river stages may change based upon the rate of rise of the river, so contingencies should be built into the plan.

To execute the repairs resources will be needed. The levee board, along with the county/city officials should meet with the local communities to discuss the risks if nothing is done to improve the levee and how these risks can be reduced if repairs and preventive actions are taken. If the risk reduction measures are to be put in place the communities will need to be actively involved and resources will be needed to enact these measures.

North Little Rock to Gillette Levee (Segments: Old River Drainage District – Orange, Plum Bayou Levee District – Green, Baucum Levee District – Blue)



Project Description:

The North Little Rock to Gillett Levee System includes three segments, namely the Baucum Levee District, the Old River Drainage District and the Plum Bayou Levee District. The North Little Rock to Gillett Levee System is located generally on the north or left bank of the Arkansas River, approximately between 110 miles and 165 miles above the mouth of the Arkansas River beginning near the east boundary of North Little Rock at Rose City, Pulaski County, Arkansas, and extending downstream to a point about seven miles northeast of Pine Bluff, Jefferson County, Arkansas. The total length of the completed project is approximately 52.8 miles (Stations 0+00 to 2785+64). The embankment varies in height above the surrounding ground to a maximum of 26 feet, with average heights of 12 to 16 feet. The crown widths are 6 and 8 feet and 20 feet for a portion of the levee that is utilized as a roadway. The slopes are on 1V:3H on the riverside and 1V:4H on the landside. Thirty-nine culverts were constructed into the project. The levee and all drainage structures were completed on 26 July 1939. The North Little Rock to Gillett Levee System primarily serves as flood damage reduction for 568,000 acres of a mostly rural and agricultural area located along the north or left bank of the Arkansas River in Pulaski, Lonoke and Jefferson Counties, Arkansas. The North Little Rock to Gillett Levee consisted of earth levee enlargements, connections and extensions of former levee systems.

The Baucum segment is the most upstream segment of the system. The segment starts in Rose City community of North Little Rock (Station 0+00) and extends downstream approximately 6 miles (Station 314+46.2). Typical levee sections within the Baucum Levee include a top width of 6 feet and side slopes of 1V:2.5H.

Risk Assessment:

In Progress

The LSOG considers the risk associated with the Baucum Levee Segment (LST ID 14) to be high (LSAC 2) for Prior to Overtopping based on moderate life loss, very poor condition of the segment and expected poor performance during flood events and moderate (LSAC 3) for Overtopping due to infrequent likelihood of overtopping and moderate associated consequences. Baucum Levee currently has several unacceptable ratings: Culverts/pipes have not been inspected, several encroachments that could cause stability issues or embankment seepage and piping, settlement issues at numerous locations along the crown, slope stability issues due to existing slope failures, depressions and rutting of over 2 feet were encountered at the crown, bank erosion has occurred at one location and there is no closure plan or stockpile of sandbags. Also, there has been no management organization for the levee since 2009 when all board commissioners resigned.

The LSOG considers the risk associated with the Old River Drainage District (LST ID 26) to be moderate (LSAC 3) for Prior to Overtopping due to the potential for moderate performance with moderate associated consequences and also to be moderate (LSAC 3) for Overtopping due to the infrequent likelihood of overtopping and moderate consequences. Embankment seepage concerns include unwanted vegetation with extensive root systems, the age and condition of culverts, and large, widespread animal burrows on both sides of the embankment. In addition, there is no written Risk Assessment.

Little Rock Flood Protection Levee

Project Description

The Little Rock Pulaski County Drainage District No. 2 system is approximately 8 miles in total length with 7-3/4 miles of earthen levee, 1/4 mile of floodwall, four (4) pump stations and fourteen (14) drainage structures. The system does not include any closure structures. Original construction was completed in Jan. 1950. The system provides flood protection for 2,560 acres of urban land including residential housing, commercial businesses and industrial properties. The City of Little Rock's Adams Field Wastewater Treatment Facility and the Little Rock National Airport (Adams Field) are also located within the protected area.

The general design of the earthen levee consists of 1V:3H slopes with a 10 foot wide crest, except for a section of the levee that consists of false berms where a 30 foot wide berm was constructed on the riverside of the levee and a varying width berm on the landside. The bermed levee was constructed of pervious soils on the landside of the levee and impervious in the riverside portion of the levee. Additionally, a 6' deep by 7' wide inspection trench located 5 feet towards the riverside of the levee was considered in the portion of the levee that was constructed without the false berms. The butress floodwall was constructed as 1 foot thick and 15 feet tall wall embedded approximately 2 feet. A drain tile consisting of a 5" perforated pipe was installed along the landside portion of the wall foundation. The cut-off wall extended approximately 4'-3" below the bottom of the footing. The wall was also constructed with flashboard stirrups.

Since construction, the levee has been modified to include the installation of a pressure relief well for under seepage control near Gregg Street Pump Station and changes in the alignment to accommodate the expansion of the airport. Documentation of the modifications due to the airports expansion have not been found.

Risk Assessment

The risk associated with the Little Rock Pulaski County Drainage District No. 2 is considered to be low based on anticipated good performance and low associated consequences. The risk is driven by uncertainties regarding seepage and the ability to close many below grade crossings. The levee is expected to perform well under significant loading. There is some performance uncertainty prior to overtopping due to potential embankment seepage associated with the numerous animal burrows and multiple encroachments that penetrate the levee; embankment stability concerns are related to past slope failures which have been repaired however, the high plasticity clay in the levee embankment could lead to similar slides in the future. The Bill and Hillary Clinton National Airport is located within the leveed area but is estimated to experience only minor inundation.

There has been very limited loading on this particular levee and thus there has not been any history of seepage and piping. The soil boring indicate that the foundation and borrow material are predominately sandy clayey silts and sandy silts with sandier material occurring principally on the north and east sides of the project (along the Arkansas River), this material has the potential for seepage and piping. During times of significant loading the sponsor should be aware of this potential and monitor the landside of the levee for any evidence of seepage. The embankment along Fourche Creek consist mostly of high plasticity clay which are subject to cracking during extended dry periods. This desiccation cracking contribute to the slopes slides which could lead to the lowering of the embankment crown and the overtopping of the embankment if the embankment is fully loaded.

The Little Rock-Pulaski Drainage District No. 2 hired an engineering firm to perform detailed geotechnical and hydraulic analysis/investigations for the FEMA certification of the levee. This analysis/investigation lead to the repair of existing slope slides and the replacement of damage culverts. The sponsor received a FEMA notification letter dated June 10, 2015 that the levee has met minimum certification requirements outline in Title 44 of the Code of Federal Regulation, Section 65.10 and that the levee certification documents have been accepted.

Rock Creek Levee

Project Description:

The Rock Creek levee and floodwall system is located in Boyle Park on Rock Creek in the City of Little Rock, Pulaski County, Arkansas and is part of the Rock Creek Levee and floodwall system is part of the larger Fourche Bayou Basin Project which was authorized by Section 401(a) of the Water Resources Development Act of 1986 (Public Law 99-662).

The Rock Creek system is 0.6 miles in total length and contains 0.5 miles of earthen levee, 0.1 miles of floodwall, and no drainage structures or pump stations. The Rock Creek system primarily serves as flood damage reduction for properties adjacent to Rock Creek in the City of Little Rock, Pulaski County, Arkansas.

The Rock Creek Levee system contains one section of floodwall. The floodwall begins approximately 20 feet south of W 24th Street at Station -3+60 and continues south for approximately 360 feet to the beginning of the earthen levee at Sta 0+00. The elevation of the floodwall varies from elevation 300.0 to 297.0 and has a maximum height of approximately 4 feet (COE Memorandum 2008).

The Rock Creek system was certified by FEMA in 2009 as providing protection against the base flood (FEMA 2009). The Flood Insurance Study (FIS) for the City of Little Rock, Arkansas was last revised in October 2001. The FIS shows peak discharges for Rock Creek, which is the principal tributary of Fourche Creek, which is a tributary of the Arkansas River.

Risk Assessment:

The Rock Creek levee and floodwall system is located in Boyle Park on Rock Creek in the City of Little Rock, Pulaski County, Arkansas and is part of the Rock Creek Levee and floodwall system is part of the larger Fourche Bayou Basin Project which was authorized by Section 401(a) of the Water Resources Development Act of 1986 (Public Law 99-662).

The Rock Creek system is 0.6 miles in total length and contains 0.5 miles of earthen levee, 0.1 miles of floodwall, and no drainage structures or pump stations. The Rock Creek system primarily serves as flood damage reduction for properties adjacent to Rock Creek in the City of Little Rock, Pulaski County, Arkansas.

The Rock Creek Levee system contains one section of floodwall. The floodwall begins approximately 20 feet south of W 24th Street at Station -3+60 and continues south for approximately 360 feet to the beginning of the earthen levee at Sta 0+00. The elevation of the floodwall varies from elevation 300.0 to 297.0 and has a maximum height of approximately 4 feet (COE Memorandum 2008).

The Rock Creek system was certified by FEMA in 2009 as providing protection against the base flood (FEMA 2009). The Flood Insurance Study (FIS) for the City of Little Rock, Arkansas was last revised in October 2001. The FIS shows peak discharges for Rock Creek, which is the principal tributary of Fourche Creek, which is a tributary of the Arkansas River.

Roland Drainage District Levee

Project Description:

The Roland Drainage District Local Protection Project was authorized by the Flood Control Act of December 22nd, 1944. The levee system was constructed from July 4th, 1947 through March 31st, 1948. The project is located on the right bank of the Arkansas River in Pulaski County, Arkansas. The total length of the levee is 4.1 miles in length. The top of levee elevations for Roland Drainage District range approximately from 278.1 feet to 283.0 feet. The embankment averages 16 feet in height, has a crown width of 10 feet and 1V:3H slopes on both the landside and riverside.

The system primarily serves to protect the people and property from floods in an agricultural area of approximately 3,870 acres located along the right bank of the Arkansas River in Pulaski County, Arkansas. This agricultural area includes very little residential housing and very little, if any, commercial businesses.

The Record Drawings indicate that the top of levee elevations for Roland Drainage District range approximately from 278.1 feet to 283.0 feet. At the time of construction the levee system was intended to account for floods up to “1.5 feet above the water level of a flood crest reaching 36.2 feet on the Little Rock Gage”.

Risk Assessment:

The Roland Drainage District Local Protection Project was authorized by the Flood Control Act of December 22nd, 1944. The levee system was constructed from July 4th, 1947 through March 31st, 1948. The project is located on the right bank of the Arkansas River in Pulaski County, Arkansas. The total length of the levee is 4.1 miles in length. The top of levee elevations for Roland Drainage District range approximately from 278.1 feet to 283.0 feet. The embankment averages 16 feet in height, has a crown width of 10 feet and 1V:3H slopes on both the landside and riverside.

The system primarily serves to protect the people and property from floods in an agricultural area of approximately 3,870 acres located along the right bank of the Arkansas River in Pulaski County, Arkansas. This agricultural area includes very little residential housing and very little, if any, commercial businesses.

The Record Drawings indicate that the top of levee elevations for Roland Drainage District range approximately from 278.1 feet to 283.0 feet. At the time of construction the levee system was intended to account for floods up to "1.5 feet above the water level of a flood crest reaching 36.2 feet on the Little Rock Gage".

North Little Rock Levee & Floodwall

Project Description:

The risk associated with the Little Rock Pulaski County Drainage District No. 2 is considered to be low based on anticipated good performance and low associated consequences. The risk is driven by uncertainties regarding seepage and the ability to close many below grade crossings. The levee is expected to perform well under significant loading. There is some performance uncertainty prior to overtopping due to potential embankment seepage associated with the numerous animal burrows and multiple encroachments that penetrate the levee; embankment stability concerns are related to past slope failures which have been repaired however, the high plasticity clay in the levee embankment could lead to similar slides in the future. The Bill and Hillary Clinton National Airport is located within the leveed area but is estimated to experience only minor inundation.

There has been very limited loading on this particular levee and thus there has not been any history of seepage and piping. The soil boring indicate that the foundation and borrow material are predominately sandy clayey silts and sandy silts with sandier material occurring principally on the north and east sides of the project (along the Arkansas River), this material has the potential for seepage and piping. During times of significant loading the sponsor should be aware of this potential and monitor the landside of the levee for any evidence of seepage. The embankment along Fourche Creek consist mostly of high plasticity clay which are subject to cracking during extended dry periods. This desiccation cracking contribute to the slopes slides which could lead to the lowering of the embankment crown and the overtopping of the embankment if the embankment is fully loaded.

The Little Rock-Pulaski Drainage District No. 2 hired an engineering firm to perform detailed geotechnical and hydraulic analysis/investigations for the FEMA certification of the levee. This analysis/investigation lead to the repair of existing slope slides and the replacement of damage culverts. The sponsor received a FEMA notification letter dated June 10, 2015 that the levee has met minimum certification requirements outline in Title 44 of the Code of Federal Regulation, Section 65.10 and that the levee certification documents have been accepted.

Risk Assessment:

Although the levee has limited loading history, it is expected to perform well during a significant loading event. There are some concerns with seepage due to the condition of one discharge pipe. However, the risk associated with the North Little Rock Levee and Floodwall is considered to be moderate based on low life safety and moderate property damage. The estimated property damages are $23 million.

The North Little Rock Levee and Floodwall has performed very well since construction was completed in 1942. But the maximum water that has been placed on the levee has only been three feet, which was in April 1945. The maximum water that can be placed on the levee is approximately 10 feet. The additional 7 feet of water on the levee could lead to the development

of water flow through and or under the earthen levee, especially in areas where there are animal burrows, and the water flow could contribute to uncontrolled flow around the rusted discharge pipe. The additional 7 feet of water could also lead to uncontrolled flow under the floodwall if the sheetpile cutoff wall is damaged because of the tree roots.

The uncontrolled water flow in any of the locations noted could be fast enough to move the sandy material and create a hole under the levee, the floodwall or the culvert. This hole could increase in size allowing more water to flow and the levee could collapse creating a depression in the levee or cause the floodwall to lean resulting in the lowering of the levee or floodwall height. This lowering of the levee height could lead to the overtopping of the levee which could lead to a levee failure, resulting in the flooding of the areas behind the levee.

To further protect themselves, the sponsor and the local government, along with the community, should review the current evacuation plan, ensuring the plan includes but not be limited to, designated river stages to set into action the highwater inspections; closure of culvert gates and the placement of the stoplog structures. The plan should also include designated evacuation routes and river stages to execute the evacuation. It should be noted that these designated action river stages may change based upon the rate of rise of the river, so contingencies should be built into the plan.

Riverdale Private Levee

Project Description:

In Progress

The LSOG considers the risk associated with the Baucum Levee Segment (LST ID 14) to be high (LSAC 2) for Prior to Overtopping based on moderate life loss, very poor condition of the segment and expected poor performance during flood events and moderate (LSAC 3) for Overtopping due to infrequent likelihood of overtopping and moderate associated consequences. Baucum Levee currently has several unacceptable ratings: Culverts/pipes have not been inspected, several encroachments that could cause stability issues or embankment seepage and piping, settlement issues at numerous locations along the crown, slope stability issues due to existing slope failures, depressions and rutting of over 2 feet were encountered at the crown, bank erosion has occured at one location and there is no closure plan or stockpile of sandbags. Also, there has been no management organization for the levee since 2009 when all board commissioners resigned.

The LSOG considers the risk associated with the Old River Drainage District (LST ID 26) to be moderate (LSAC 3) for Prior to Overtopping due to the potential for moderate performance with moderate associated consequences and also to be moderate (LSAC 3) for Overtopping due to the infrequent likelihood of overtopping and moderate consequences. Embankment seepage concerns include unwanted vegetation with extensive root systems, the age and condition of culverts, and large, widespread animal burrows on both sides of the embankment. In addition, there is no written procedure for the culvert gate closure and the equipment needed for closure is lost. There are no official board members on the levee district, community awareness is low. These concerns are paritially offset by the sparce population in the leveed area adjacent to this levee segment.

Risk Assessment:

The risk associated with the Riverdale Private Levee is considered to be moderate. The 2.86 mile ring levee provides protection to a highly developed area that consists of homes and office complexes with an estimated value $225 million. There are numerous encroachments on and near the levee; multiple residential structures are located on the levee crown and two office buildings were constructed through the levee and now act as floodwalls. There is limited design/construction details for most of

the structures along the levee and because of the limited construction details there is no way to assess the number and type of utility penetrations into the levee embankment.

These unknowns make it very difficult to assess the reliability of the system.

The Riverdale Private Levee Board is a very active levee board. The levee obtained FEMA accreditation in 2012; with this accreditation, the levee board developed an Operation and Maintenance plan and Closure Plan. Over the past 5 years the board has followed the standards set forth in their O&M manual.

The levee district also has a written closure plan for all closures, including the lock, culverts gates and road crossings. During the May 2015 high water event the district carried out the closure procedures for the lock and the culvert gates. At this particular time, there is no written evacuation plan, to effectively reduce the risk of living behind a levee, an evacuation plan is needed. It is important that the sponsor, along with the county/city officials and the community as a whole, develop this evacuation plan. This plan should include but not be limited to designated river stages to set into action inspections, closure of culvert gates, and sand bag closure of the road crossing. It should be noted that the designated action river stages may change based upon the rate of rise of the river, so contingencies should be built into the plan. The evacuation plan should also include designated evacuation routes and river stages to execute the evacuation.

Bayou Meto Levee & Pumping Station

No statistical data available

Pulaski County Farm Private Levee

No statistical data available

Previous Occurrences

There have been no previous "Levee Failures" recorded for the permitted dams located in Pulaski County.

Probability of Future Events

Because there are no known levee failures to have occurred in Pulaski County, it is not possible to predict a future event. However, it is indicated on each of the levee maps the inundation area associated with each levee should a failure occur. There is always a possibility of future occurrences; likely less than 1%.

Impact and Vulnerability

As indicated by the National Levee Data Base, Pulaski County has 380.8 mile of levees affecting 13,326 people and 4,448 structures and the total property value of $1.482 Billion. One can assume that a levee failure of the High Risk Levees would be detrimental to the communities. The longest levee system in place is the North Little Rock to Gillette Levee District which affects 4 cities and 3 counties. The table below provides detailed information for each levee system.

ID	System ID	Responsible Entity	Flooding of Record	Length	Levee area Sq mile	Communities Protected	Flood Source	Risk #	People	Structures	Property Value	Probability of Overtop
Head of Fourche Island to Pennington Bayou	3705000001	USACE-Little Rock	6/1/1933	21.38	46.49	Little Rock, Saline Co, Pul Co, Grant Co, Jefferson Co, Wrightsville	Ark River	high	2,828	176	$266M	0.001
NLR to Gillette	3705000003	USACE-Little Rock	6/1/1933	53.27	188.64	Keo, North Little Rock, Lonoke Co, Jefferson Co, England, Pulaski Co, Sherrill	Ark River	high	7,842	3,799	$921M	0.001
Little Rock Flood Protection Levee	3705000004	USACE-Little Rock	6/1/1933	7.51	0.47	Little Rock, Pulaski Co	Ark River	low	26	14	$5.6M	0.002
NLR Levee & Floodwall	3705000002	USACE-Little Rock	6/1/1933	2.97	0.22	North Little Rock	Ark River	mod	368	116	$44M	0.001
Riverdale Private Levee	3705000036	USACE-Little Rock	6/1/1933	289	0.35	Little Rock	Ark River	mod	2,046	249	$223M	0.02
Rock Creek Levee	3705000006	USACE-Little Rock	5/1/2011	0.59	0.024	Little Rock	Rock Creek	low	115	49	$11.1M	0.005
Roland Drainage	3705000007	USACE-Little Rock	6/1/1933	4.09	4.51	Pulaski Co	Ark River	low	101	45	$12.4M	0.0005

District Levee												
Bayou Meto Levee & Pumping Station	3705000018	USACE-Little Rock	6/1/1933	0.064	0.054	North Little Rock & Pul Co	Ark River	N/A	0	0	0	0
Pul Co. Farm Private Levee	3705000058	USACE-Little Rock	4/19/1927	1.89	0.36	Pulaski Co	Little Maumelle River	N/A	0	0	0	0

3.4.2 Drought

A drought is a period of unusually persistent dry weather that persists long enough to cause serious deficiencies in water supply (surface or underground). Droughts are slow onset hazard, but over time they can severely affect crops, municipal water supplies, recreation resources and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impacts can be significant. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. In addition, human actions and demands for water resources can accelerate drought-related impacts.

Location

All areas of Pulaski County and plan participants are equally likely to experience severe drought. There is no defined geographic hazard boundary, and the entire planning area is equally susceptible to this hazard.

Extent

Drought Severity Classification

			Ranges				
Category	Description	Possible Impacts	Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short and Long-term Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0-2	0-2	-2.0 or less	0-2

Source: U.S. National Drought Mitigation Center.

Previous Occurrences:

According to the U.S. Drought Monitor, since 2015 there were:

- 3- D4 incidents reported
- 29- D3 incidents reported
- 74- D2 incidents reported
- 113- D1 incidents reported
- 174- D0 incidents reported

According to NCDC there has been only 1 drought submitted on record for Pulaski County (from 1/1/15-12/31/2019)

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K
PULASKI (ZONE)	PULASKI (ZONE)	AR	11/14/2017	00:00	CST-6	Drought		0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Probability of Future Events

Based on previous occurrences, the planning area is likely to see the probability of a drought event of 48% in any given year. The entire planning area is expected to experience a drought that is rated between a D0 and D3 in any given year.

Impact and Vulnerability

The primary and most devastating effect for planning area is the lack of water. As a dry period progresses and water supplies dwindle, existing water supplies are overtaxed and dry up. If the drought is long term, it may result in permanent changes in settlement, social, and living patterns in these jurisdictions. During a past drought event, the water utility companies serving these jurisdictions instituted mandatory water restrictions. Cascading effects also include major ecological changes such as increased flash flooding and desertification. All populations in these jurisdictions are vulnerable during a drought event; however, children and elderly are the biggest concerns for the communities as they may suffer from dehydration before other populations.

The **economic impacts** of drought on a community can mount up after just one season of drought. Farms may lose money due to crop failures and an inability to feed and water livestock during drought. In turn, agriculture-dependent businesses conduct less business and lose money. Additionally, tourists may be reluctant to visit drought-affected areas, reducing another source of community income. Use of forests for recreational purposes may be discouraged because of fire hazards. Water based recreation may also decrease. Businesses relying on these activities will suffer. Because of a general increase in the potential for bankruptcy among businesses, banks may become reluctant to loan money or extend loan periods. In this way, the economic impacts of drought spread through and beyond affected communities.

Similarly, drought's **environmental impacts** can degrade the habitability of a region. Rivers and lakes drop to low levels and turbidity and salinity increase, affecting fish habitat. Mountain animals have less to drink and migrate to wetter areas or to places of water concentration. The potential for catastrophic wildfires increases.

Drought can cause a series of **social impacts**. Drought affects human health, both physically and emotionally, in both rural and urban areas. People lose their peace of mind if they're not certain they'll have enough water. They may also change their habits in response to animals that come into communities in search of food and water, or to the increased risk of fire caused by dry landscaping around their homes.

The school districts in Pulaski County will also be greatly affected by the dwindling water supply. Limited water supplies may also affect the schools' ability to provide meal services. School schedules could be hindered, or canceled altogether.

3.4.3 Earthquake

An earthquake is what happens when two blocks of the earth suddenly slip past one another. The surface where they slip is called the fault or fault plane. The location below the earth's surface where the earthquake starts is called the hypocenter, and the location directly above it on the surface of the earth is called the epicenter.

Sometimes an earthquake has foreshocks. These are smaller earthquakes that happen in the same place as the larger earthquake that follows. Scientists can't tell that an earthquake is a foreshock until the larger earthquake happens. The largest, main earthquake is called the mainshock. Mainshocks always have aftershocks that follow. These are smaller earthquakes that occur afterwards in the same place as the mainshock. Depending on the size of the mainshock, aftershocks can continue for weeks, months, and even years after the mainshock.

Location

Data is not available to predict the location of future earthquakes for areas of Pulaski County; therefore it is assumed that all areas of the planning area are equally susceptible to earthquakes. The Arkansas State Mitigation Plan describes the regions with high probability of future earthquakes in the State of Arkansas are along the New Madrid Fault. The portion of Arkansas that is likely to experience damage is located in the northeast portion of the state. Pulaski County is not located in this area.

Extent

The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally - total destruction. Although numerous intensity scales have been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. This scale, composed of increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects.

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at that place.

The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above.

The following is an abbreviated description of the levels of Modified Mercalli intensity.

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Previous Occurrences

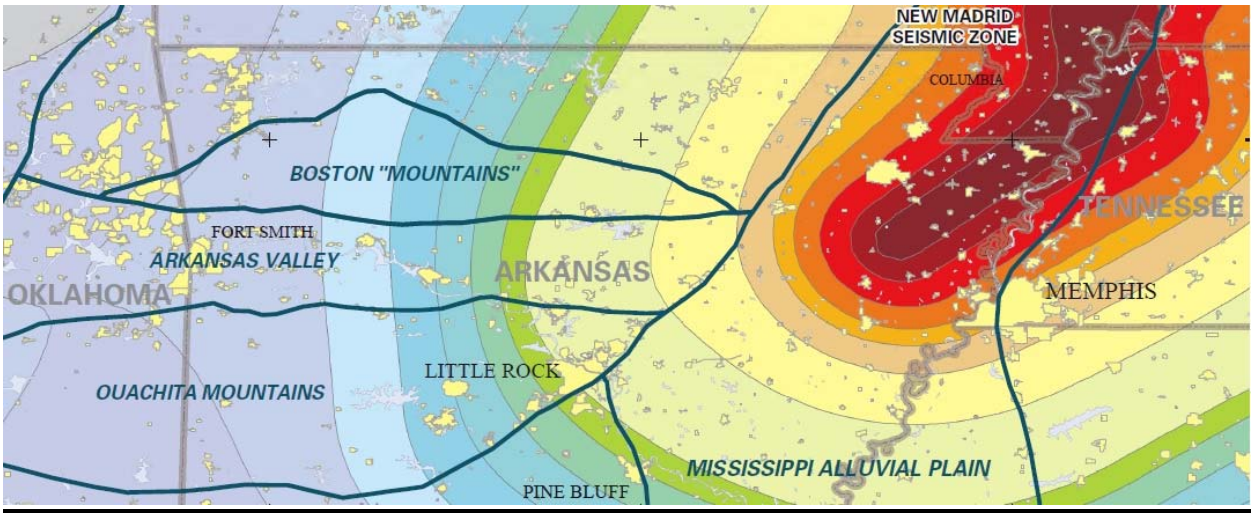
Earthquakes can occur nearly anywhere in Arkansas. Earthquakes that occur outside of the New Madrid Seismic Zone are generally small and have caused little to no damage. One of the most memorable earthquakes outside the NMSZ occurred on New Year's Day in 1969 near **Ferndale (Pulaski County)** and was felt over northern and central Arkansas. Residents of **Little Rock (Pulaski County)** reported cracked plaster and shifted furniture. This earthquake also caused trees, utility lines, and tall buildings to sway. Many people reported having difficulty standing. The earthquake was estimated to be 4.2 to 4.5 in magnitude.

There has been one recorded earthquake in the planning area according to the Arkansas Geological Survey since 2015. However, according to a "Final Technical Report" conducted by the University of Memphis in 2010 as an "Investigation of the Magnitude and Timing of Paleo-Earthquakes in Southeast Arkansas," there is evidence of 3 prehistoric earthquakes occurring in Pulaski County in the last 7,000 years.

Probability of Future Events

Based on lack of previous occurrences in recent history, the probability of an earthquake event in any given year is 1%. Therefore, a future event is extremely unlikely to occur before the next migration plan update. However, it is possible that all plan participants in Pulaski County could experience up to a 6.1 magnitude earthquake at some point in the future, which could be thousands of years in the future.

Pulaski County lies with the Moderate to Weak Zone of the New Madrid Seismic Map.



Impact and Vulnerability

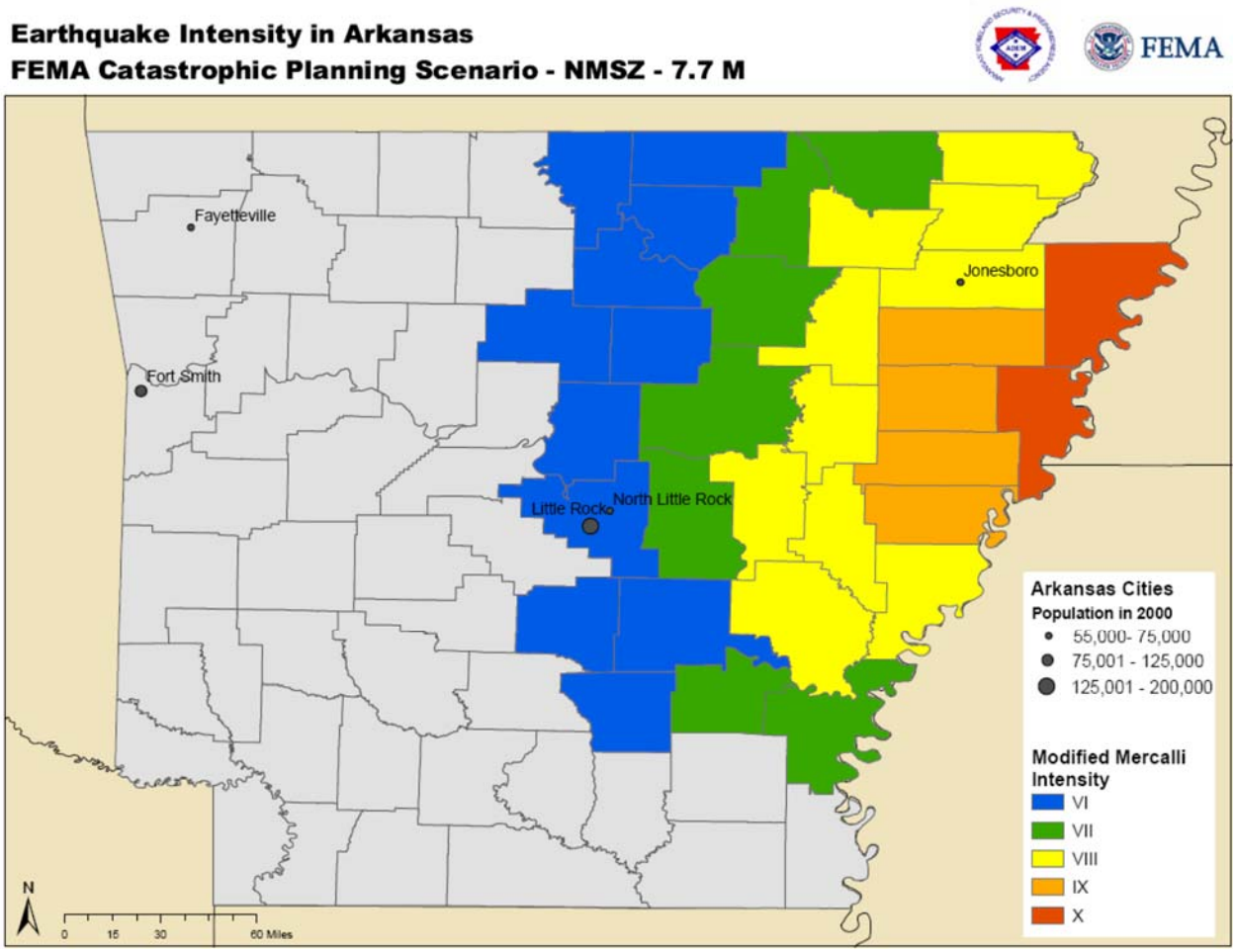
Most earthquake-related property damage and deaths are caused by the failure and collapse of structures due to ground shaking. Impacts to the Pulaski County planning area during a New Madrid event would lend more toward recovery, i.e. acceptance of displaced residents from other counties and the providing of resources to the overall state recovery effort.

The magnitude of a future probable event for the planning area would not impact any areas differently, i.e. urban vs. rural so building density would not be a factor. There are vulnerable commercial structures located in the planning area that are constructed with unreinforced masonry. During a Magnitude 6.1 on the Richter Scale, the planning area could experience destruction up to about 99 miles across populated areas. According to the Modified Mercalli Scale, an event of this magnitude (IX equivalent) could cause buildings to shift off foundations, foundation cracks, and break underground pipes.

All areas of the planning area contain housing that is constructed with unreinforced masonry. The walls will be cracked or collapsed. The windows would be broken and unanchored furniture will be turned over or displaced. There are also areas with mobile homes that are mounted on piers. The homes could be knocked off their foundation and drop 24 to 36 inches before striking the ground. Any residents in mobile homes are vulnerable and would be knocked from their current position to the floor and injured or killed. The contents of the home would be scattered and damaged, and structures connected to the home can be torn away from the main structure.

Elderly and small children (including students at the Crossett and Hamburg Schools) are most vulnerable to this hazard as they may be unable to reach safety (outdoors) as quickly as others. Additionally, an earthquake could create stress or take an emotional toll on this population for fear of future events.

Infrastructure such as roads, bridges, power lines, etc. can also be vulnerable to a future earthquake event. Services such as cell service and landlines may become unavailable as well due to damage or capacity limits. Roads and bridges can collapse, power lines fall causing major power outages. Both issues can cause delays for emergency responders.



3.4.4 Extreme Heat

Extreme heat is characterized by a combination of very high temperatures and exceptionally humid conditions. Temperatures that hover 10 degrees or more above the average high temperature for the region and lasts for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. When persisting over a period of time, it is called a heat wave. Many areas of the United States are susceptible to heat waves and Arkansas is certainly one of these.

The major threat of extreme heat or heat waves is heatstroke, a medical emergency that can be fatal. Most at risk are outdoor laborers, the elderly, children, and people in poor physical health. The combined effects of high temperature and high humidity are more intense in urban centers than in rural areas.

An estimation of the heat index is a relationship between dry bulb temperatures at different humidity's and the skin's resistance to heat and moisture transfer. Because skin resistance is directly related to skin temperature, a relation between ambient temperature and relative humidity versus skin or apparent temperature can be determined. If the relative humidity is higher or lower than the base value, then the apparent temperature is higher or lower than the ambient temperature.

Approximately 200 deaths a year are attributable to extreme heat in the U.S. There were no records available to the HMPT documenting any deaths in the county which was attributable to extreme heat, although it is doubtful there have not been some over the years, though perhaps not recorded as such or attributed directly to the weather.

Location

There is no defined geographic hazard boundary for extreme heat. Extreme heat generally affects people rather than property. All plan participants are equally likely to experience an extreme heat event.

Extent

All plan participants are affected seasonally by summer heat, with summer temperatures averaging 89 degrees (all temperatures given in Fahrenheit). Between 2000 and 2016, areas in Pulaski County have recorded high temperatures between 100 and 108 degrees. The highest recorded temperature of 108 occurred on August 28, 2000. Temperature readings of 107 were recorded on August 31, 2000 and August 4, 2011. The past occurrences help predict that the participating jurisdictions mentioned above are likely to expect extreme heat up to 108 degrees Fahrenheit.

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmosphere Administration (NOAA) this relationship is referred to as the "Heat Index" which is shown below. The Heat Index measures how hot it feels outside when humidity is combined with high temperatures.

NWS Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Heat Index/Heat Disorders

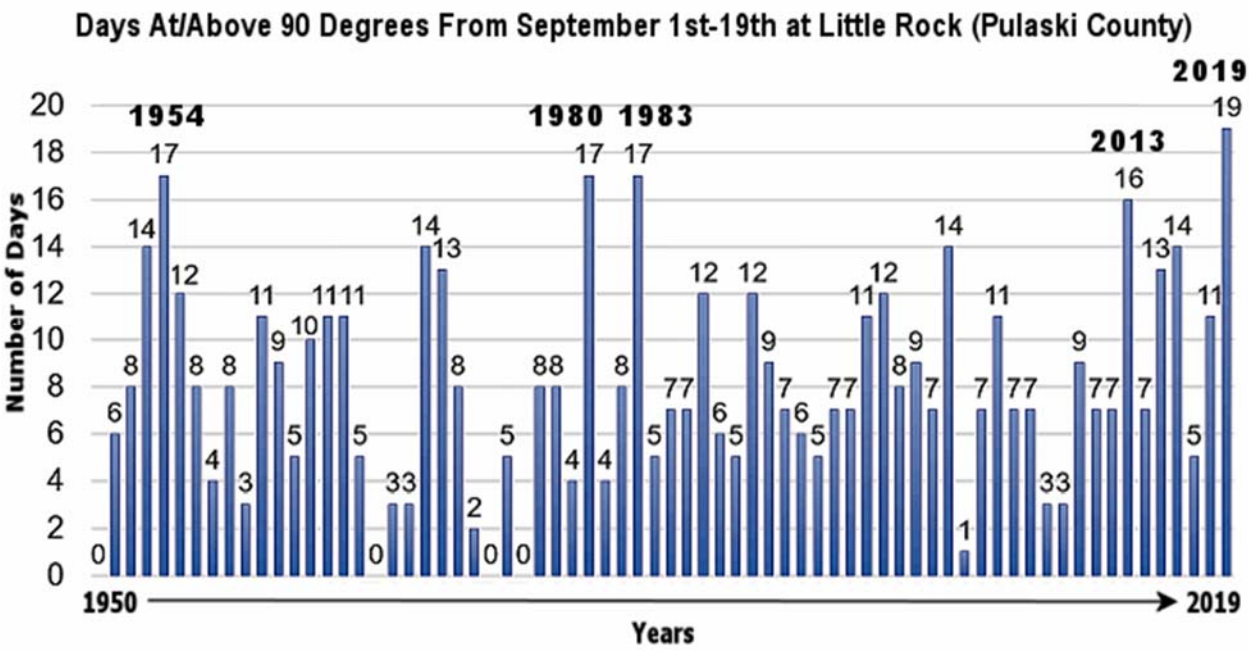
Heat Index	Possible heat disorders for people in higher risk groups
130 or higher	Heatstroke/sunstroke highly likely with continued exposure.
105-130	Sunstroke, heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.
90-105	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
80-90	Fatigue possible with prolonged exposure and/or physical activity.

IMPORTANT: Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Heat Disorder	Symptoms	First Aid
Sunburn	Redness and pain. In severe cases swelling of skin, blisters, fever, and headaches.	Ointments for mild cases if blisters appear and do not break. If breaking occurs, apply dry sterile dressings. Serious, extensive cases should be seen by a physician.
Heat Cramps	Painful spasms usually in muscles of the legs and abdomen possible. Heavy sweating.	Firm pressure on the cramping muscles, or gentle massaging to relieve the spasm. Give sips of water. If nausea occurs, discontinue use.
Heat Exhaustion	Heavy sweating, weakness, skin cold, pale and clammy. Pulse thready. Normal temperature possible. Fainting and vomiting.	Get victim out of sun. Lay down and loosen clothing. Apply cool, wet cloths. Fan or move victim to air conditioned room. Sips of water. If nausea occurs, discontinue use. If vomiting continues, seek immediate medical attention.
Heat Stroke (*sunstroke*)	High body temperature (106 F or higher). Hot dry skin. Rapid and strong pulse. Possible unconsciousness.	*Heat stroke is a severe medical emergency. Summon emergency medical assistance or get the victim to a hosiptal immediately. Delay can be fatal.* Move the victim to a cooler environment. Reduce body temperature with cold bath or sponging. Use extreme caution. Remove clothing, use fans and air conditioners. If temperature rise again, repeat process. Do **not** give fluids.

Previous Occurrences

There has been one instance of "excessive heat" recorded by the NCDC on July 18, 2019. One death was reported associated with the extreme heat. However, areas of the County have recorded record breaking temperatures in 2019 with 62 days above 90º from 2015-2019.



Probability of Future Events

Based on previous occurrences, the planning area is likely to see 12.40 extreme heat events per year, so the probability of an event is 29.44% in any given year. The entire planning area is expected to experience temperatures between 100°F and 110°F any given year.

Impact and Vulnerability

All participating jurisdictions have a total vulnerable population. It has been determined that the most vulnerable are of children under 5 years and elderly over 62 years. Prolonged exposure to temperatures above 100 degrees Fahrenheit can cause significant health-related ailments that include heat stroke and even death.

Infrastructure can be affected by extreme heat as power grids become over taxed causing power outages which will contribute to the heat effects.

For the Pulaski County School Districts, the students, faculty, and staff are at risk of heat injuries during recess, and transition from building to building.

The unincorporated areas of Pulaski County and rural communities are concerned about the agriculture crops, livestock, water supply, and timber populations during extreme heat events. As temperatures rise, people and animals need more water to maintain their health. Many important economic activities like raising livestock and growing food crops require plenty of water. Agriculture, forestry, fishing and hunting, and mining continue to make up a significant portion of Pulaski County's industry. This trend remains a vulnerability of the farmers and the economy that relies on the product sales during extreme heat events.

During extreme heat, warmer temperatures make crops grow more quickly, also while warmer temperatures can reduce yields. For some crops, such as grains, faster growth reduces the amount of time that seeds have to grow and mature. Also, more extreme temperatures prevent crops from growing.

Heat waves directly threaten livestock. Heat stress can increase vulnerability to disease, reduce fertility, and reduce milk production. Pasture and feed supplies will deplete. Extreme heat will reduce the amount of quality forage available to grazing livestock. Animals that rely on grain will have a lack of feed. All the while, the prevalence of parasites and diseases will rise.

For timber plantations and forestry, the climate will influence the structure and function of forest ecosystems and plays an essential role in forest health. Increased temperature may worsen many of the threats to forests through the increase of pest outbreaks, fires, and drought.

Structures and infrastructure are vulnerable to this hazard. Roads can buckle as they become extremely hot as the chip seal and asphalt begin to soften by the heat.

3.4.5 Flooding

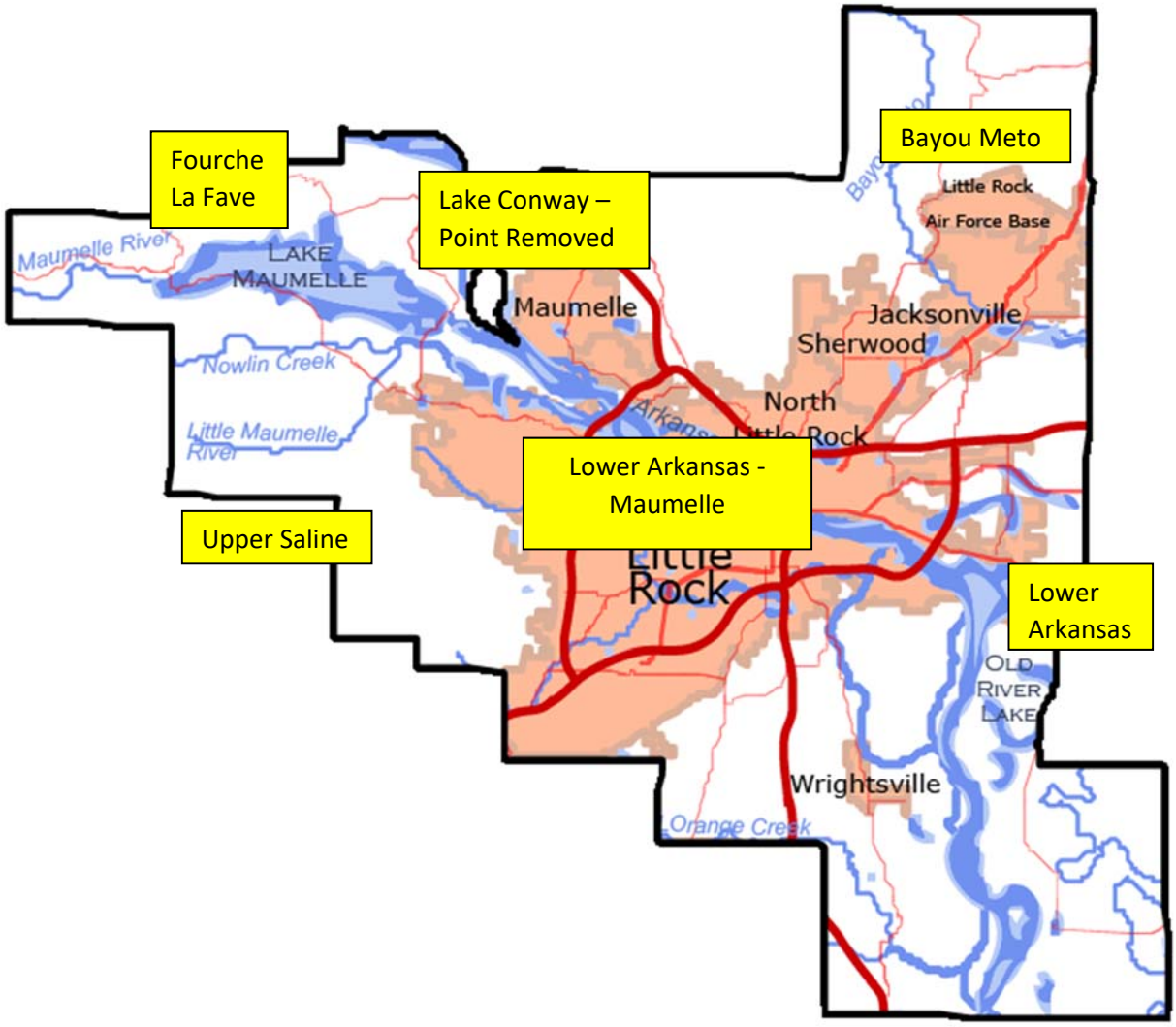
A flood is the partial or complete inundation of normally dry land. The various types of flooding include riverine flooding, and shallow flooding in Pulaski County. Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities.

Location

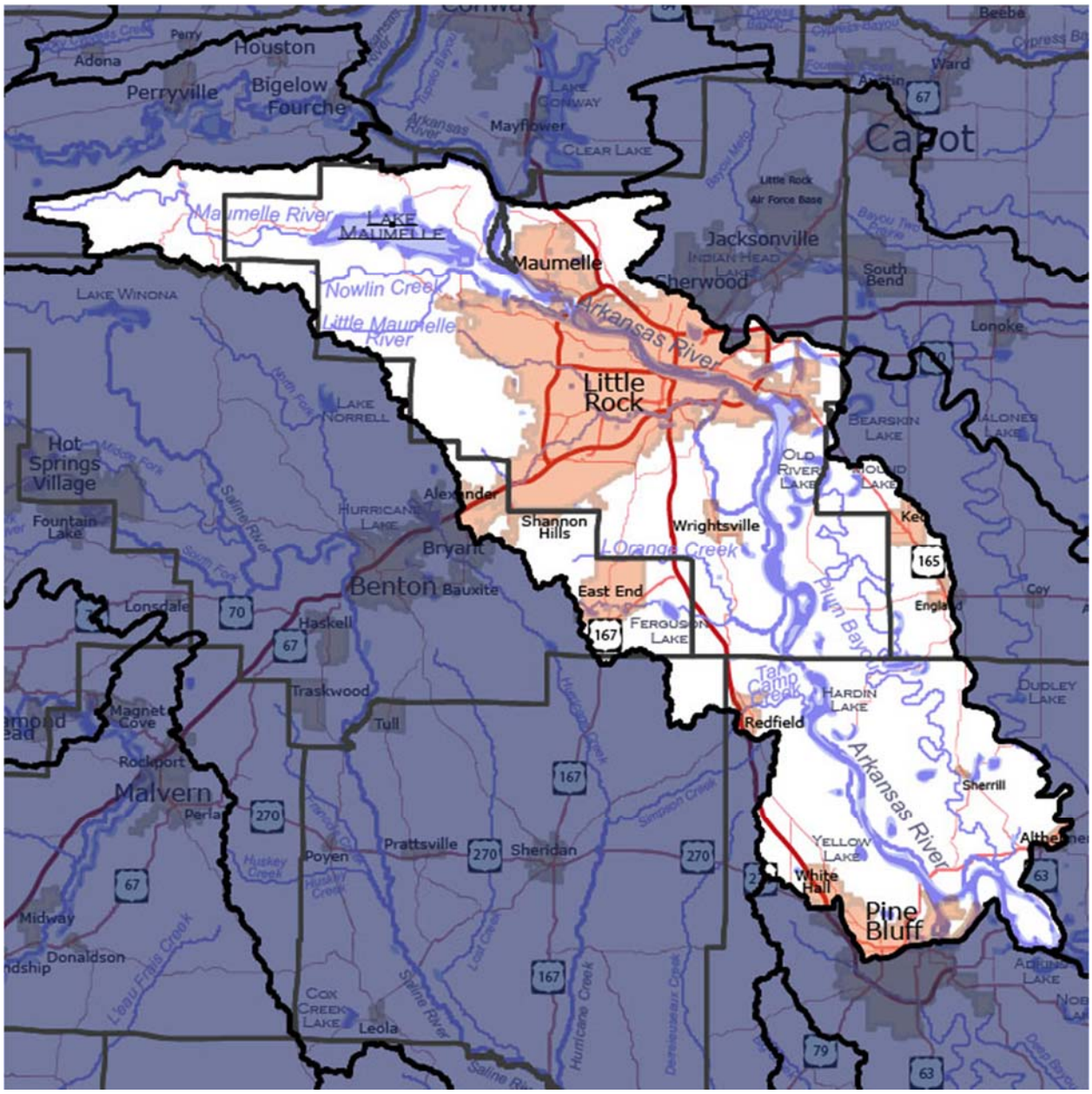
The Lower Arkansas Maumelle Watershed covers the majority of Pulaski County and includes the Cities of Little Rock, North Little Rock, Maumelle, Wrightsville and Cammack Village. Bayou Meto Watershed is located in the Northeastern tip of the County and includes Jacksonville and Sherwood. Fourche La Fave Watershed is located in the very Northwest tip of the county. Lake Conway – Point Remove is in the northern most part of the county near Maumelle. Lower Arkansas is located on the eastern boundary of Pulaski County and Upper Saline Watershed is southwest corner of Pulaski County near Saline County.

Pulaski County Watersheds

Arkansas Natural Resources Commission under Cooperating Technical Partner (CTP) with FEMA completed the Flood Risk Report for the Lower Arkansas – Maumelle Watershed on October 10, 2018. and the following non-regulatory risk assessment products of "Flood Risk Map", "Flood Risk Report," and "Flood Risk Database" were made available. A very in depth report project area included: Town of Alexander, City of Bryant, City of Cammack Village, City of England, Town of Keo, City of Little Rock, City of Maumelle, City of North Little Rock, City of Pine Bluff, Town of Redfield, City of Shannon Hills, Town of Sherrill, City of White Hall, city of Wrightsville, Faulkner County Unincorporated Areas, Grant County Unincorporated Areas, Jefferson County Unincorporated Areas, Lonoke County Unincorporated Areas, Perry County Unincorporated Areas, Pulaski County unincorporated Areas, and Saline County Unincorporated Areas.


Fourche La Fave
Lake Conway – Point Removed
Bayou Meto
Maumelle River
Lake Maumelle
Little Rock Air Force Base
Maumelle
Jacksonville
Sherwood
Nowlin Creek
North Little Rock
Little Maumelle River
Lower Arkansas - Maumelle
Upper Saline
Little Rock
Lower Arkansas
Old River Lake
Wrightsville
Orange Creek

Lower Arkansas – Maumelle Watershed



Arkansas Natural Resources Commission under Cooperating Technical Partner (CTP) with FEMA completed the full Risk MAP process for the Lake Conway – Point Remove Watershed, (09/01/2015) and the following non-regulatory risk assessment products of "Flood Risk Map", "Flood Risk Report," and "Flood Risk Database" were made available.

Arkansas Natural Resources Commission under Cooperating Technical Partner (CTP) with FEMA completed the full Risk MAP process for the Bayou Meto Watershed, (12/17/2015) and the following non-regulatory risk assessment products of "Flood Risk Map", "Flood Risk Report," and "Flood Risk Database" were made available. Arkansas Natural Resources Commission under Cooperating Technical

Partner (CTP) with FEMA completed the full Risk MAP process for the Upper Saline Watershed, (12/23/2015) and the following non-regulatory risk assessment products of "Flood Risk Map", "Flood Risk Report," and "Flood Risk Database" were made available.

No Risk MAP data is available for the Lower Arkansas Watershed at this time. It is not known if ANRC and FEMA have plans to produce Risk MAP products for these Watersheds, but this status will be revisited for future Mitigation Plan Updates to ensure the inclusion of the best available data.

Extent

NOAA data from January 2015- December 2019 indicates Pulaski County as a whole experienced 28 days of heavy rain, 1857 days (75 events) of flooding. The average precipitation for those events is 0.751724 inches. Oftentimes flooding can be a result of the condition of the land's ability to absorb precipitation, which can be affected by how much and in what time period previous rains have occurred. In events where an extreme amount of rain fall occurs over a short amount of time, the land is less able to absorb in influx of the rainfall which contributes to runoff. Runoff is also increased by the land use and development changes causing an increase in non-permeable surfaces such as asphalt and concrete.

Flood elevation data is not available for any of the planning area to determine how high the water can get. However, comparing past occurrences to rainfall received can provide an indication of what amount of rain each community can handle before experiencing flooding.

Flood severity categories used by the NWS include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threat. Any of the planning area could see any of the below categories of flooding.

- **Minor Flooding**- minimal or no property damage, but possibly some public threat or inconvenience
- **Moderate Flooding-** some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to high elevations are necessary
- **Major Flooding-** extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.

According to the Arkansas State All-Hazards Mitigation Plan (2013), should a 1% annual (100-year) flood event occur in Pulaski County, the following losses would occur:

Residential Building Losses	$121,456,000
Residential Contents Losses	$ 78,503,000
Commercial Building Losses	$141,779,000
Commercial Content Losses	$357,379,000
Other Building Losses	$ 20,143,000
Other Contents Losses	$ 59,923,000
Total Contents Losses	$495,805,000
Total Building Losses	$283,378,000
Business Disruption Losses	$ 62,809,000
Total Losses	$841,992,008

This same source also estimates crop exposure value at $18,618,000, and an annual estimated crop damages at $101,352.

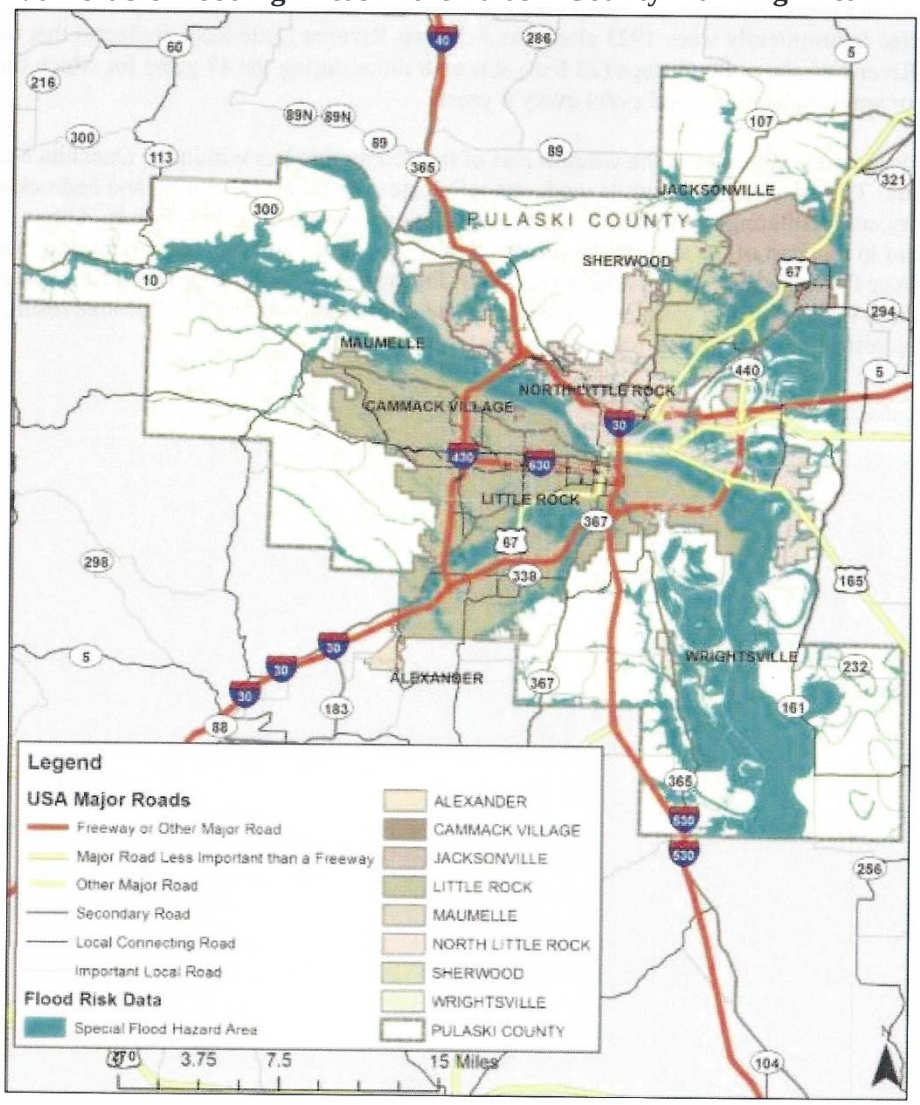
The following charts and maps are an excerpt from the 2014 Pulaski County Hazard Mitigation that provides additional information of estimated flood depths for flooding.

Floodplains and areas in the 500 year flood zone are the geographical areas affected by flood events in the Pulaski County Planning Area. The HMPT has reviewed Pulaski County's Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS), as well as worked with the County Floodplain Administrator and State of Arkansas Natural Resource Commission to conduct a risk assessment of flooding events throughout the County. Based on a conversation with a local engineering firm extremely knowledgeable of flooding in Pulaski County, the depths of flood waters in areas within the 100 year flood zone range from 2 to 4 feet while flood depths in the 500 year flood zone range from 1 to 3 feet. Refer to map below for areas vulnerable to flooding.

Riverine floods are most common in the Mississippi Alluvial Plain in the eastern part of the County and along the Arkansas River. These areas exhibit low relief and typically have flat, broad floodplains. The area surrounding the Arkansas River is subject to flood damage because of the large amounts of rain fall it receives; the wide, flat floodplain in the southeastern part of the County; large amounts of wetland area and oxbow lakes in the southeastern portion of the county; and the large numbers of structures located in the floodplain. Riverine flooding is usually caused by extensive rainfall over a period of several days or longer either in Central Arkansas or more often upstream to the west. Forty-seven years of stream gage data collected intermittently since 1923 along the Arkansas River at Little Rock indicates that the Arkansas River was above flood stage (23 feet) at least 8 times during the 47 years for which records are available, or approximately 1 flood event every 6 years.

Flash floods are most common in the western part of the county that lies within the Ouachita Mountains**.** This area exhibits high to moderate relief, steep to moderate slopes, and bedrock with low permeability, all facilitating rapid runoff, and the consequent potential for flash floods. Urban development in this part of the state exacerbates the flash flooding problem. Intense rainfall events may result in water flowing rapidly from higher elevations into valleys causing significant flood events. There have also been issues with the maintenance and clearing of drainage channels in this area resulting in obstructions restricting the flow of water during a storm.

Vulnerable Flooding Areas in the Pulaski County Planning Area

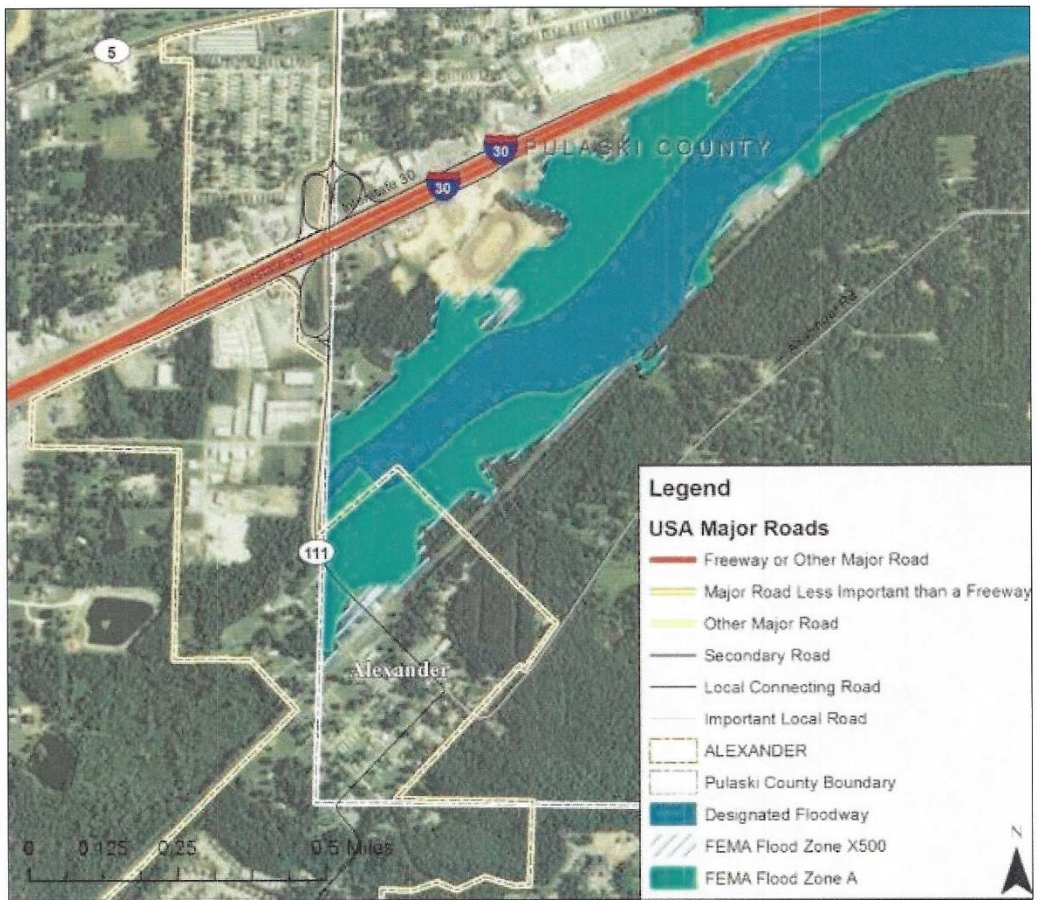


The most vulnerable structures in the Pulaski County Planning Area are repetitive loss and severe repetitive loss structures. Repetitive Loss and Severe Repetitive Loss properties are identified by FEMA's National Flood Insurance Program (NFIP). Repetitive Loss properties are those for which two or more losses of at least $1,000 each have been paid under the NFIP within any 10-year period since 1978. Severe Repetitive Loss structures are NFIP-enrolled residential or commercial properties that have at least: 1) Four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or 2) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion in such claims exceeding the market value of the building.

The extent of flood risk in the Pulaski County Planning Area varies considerably by jurisdiction. Refer below for a description and map of each jurisdiction's exposure to flood events.

Alexander: The northern corner of Alexander (approximately northwest of Earl D. Miller Lane and W 2nd Street) lies within the regulatory floodplain of Crooked Creek. Four structures lie within the
100-year floodplain and 4 structures lie within the 500-year floodplain. Refer to the map of flood zones within the City of Alexander. The City of Alexander is at a Moderate Risk from flood events.

Map of Floodplain for the City of Alexander



Cammack Village: No floodplain is located in Cammack Village, nor has Cammack Village been subject to flooding in the past. The City of Cammack Village is at a **Low Risk** from flood events.

Jacksonville: 658 structures in Jacksonville are located in the floodplain. The largest area of floodplain in Jacksonville includes most of the southwest portion of the City. Although sparsely populated in comparison to other parts of Jacksonville, significant numbers of structures are in the floodplain in several areas. These include structures along U.S. 161 near the 1-440 interchange, along U.S.161 near

Bayou Meto, between Bayou Meto and Kellogg Creek off of Oneida Street, and north of Jacksonville Cutoff Road near Harris Road. Significant numbers of structures are also located in the floodplain in the northeast comer of the City. Numerous structures are in the floodplain in neighborhoods between U.S. 167 and Foxwood Country Club, as well as west of U.S. 167 along

Quince Hill Road and west of Evans Drive. Other floodplain areas with structures include north of Graham Road along Cherry and Laural Streets, and along U.S. 167 near Vanderburg Boulevard and south of Wright Loop Road. Refer to the map of the flood zones within the City of Jacksonville. The City of Jacksonville is at a **Severe Risk** from flood events

Map of the Floodplain for the City of Jacksonville

Little Rock: Little Rock is subject to riverine and flash flooding. There are approximately 573 buildings located in the floodplain within the City of Little Rock. The majority of the City of Little Rock's floodplain area is located near the Arkansas River**.** The City of Little Rock is at a **Severe Risk** from flood events.

Little Rock School District: Little Rock School District is subject to riverine and flash flooding. Portions of the campus are within the flood zone. The majority of the Little Rock School District's floodplain area is located near the Arkansas River map which provides a graphic depiction of the

educational facilities in Pulaski County relative to the flood risk areas. The data source is the Pulaski Area Geographic Information System (PAgis) , an independent governmental agency financially supported by Pulaski County local governments. Based on the PAgis data, overall the vast majority of educational facilities in the Little Rock School District are situated outside the AE flood zone. Therefore, the Little Rock School District is at a **Moderate Risk** from flood events with the exception of the schools listed below located within the boundaries of the School District.

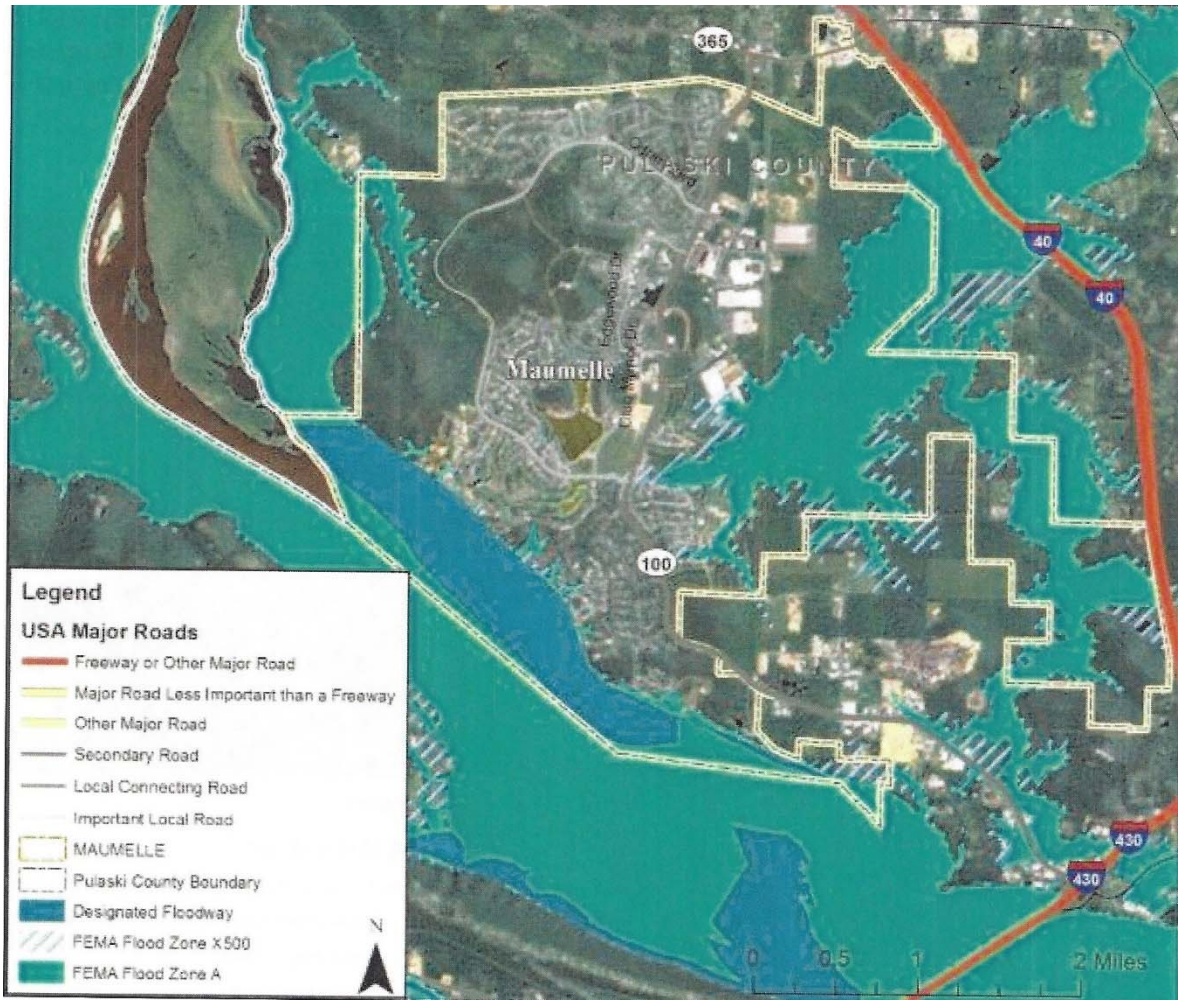
Map of the Floodplain for the City of Little Rock

<u>Maumelle:</u> 175 structures in Maumelle are located in the floodplain. The largest areas of floodplain lie in the eastern part of the City and along the Arkansas River, which forms the southwestern City boundary.

Numerous structures north of Crystal Hill Road at the extreme southeast part of the City lie within the floodplain, as well as structures along Crystal Mountain Lane south of Maumelle Country Club and along Riverwood Cove and adjacent streets. Houses along Calais Drive and Chantilly

Circle and adjacent streets are built within the floodplain as well. Refer to for a map of the flood zones within the City of Maumelle. The City of Maumelle is at a **Moderate Risk** from flood events.

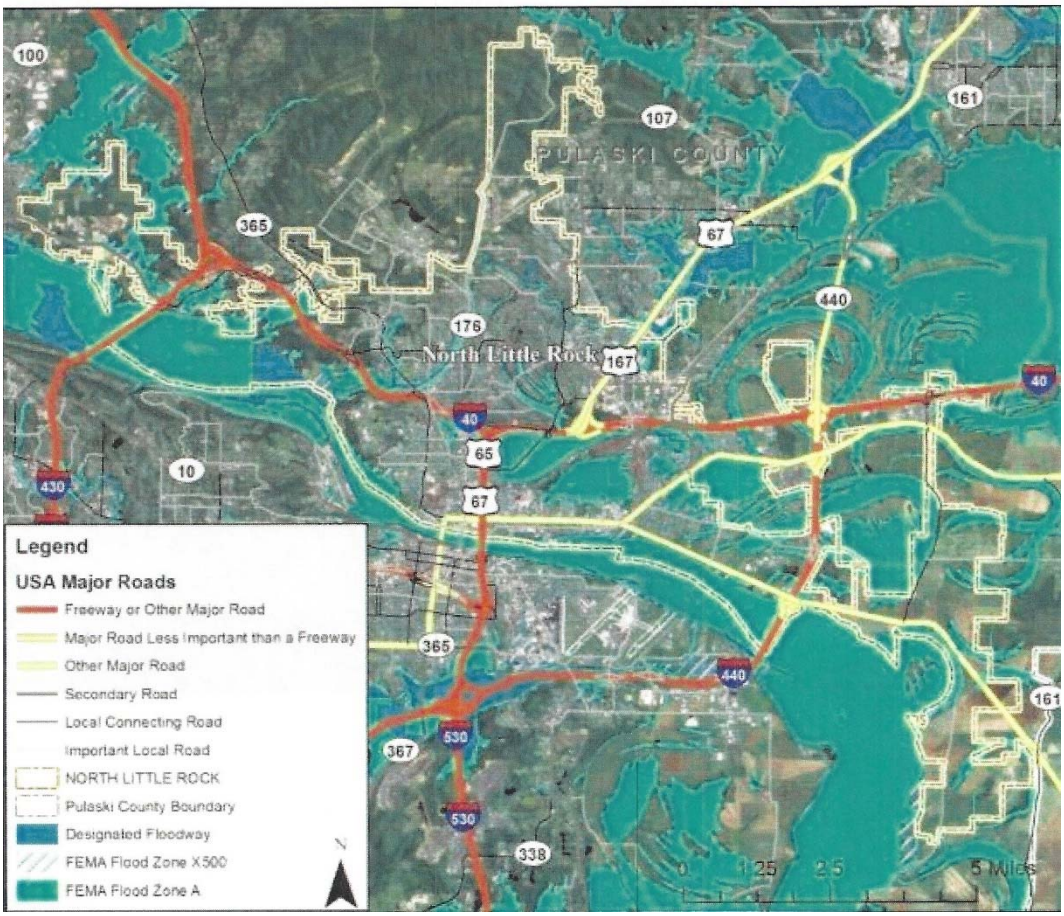
Map of the Floodplain for the City of Maumelle



<u>North Little Rock:</u> North Little Rock is subject to riverine and flash flooding. There are approximately 104 buildings located in the floodplain within the City of North Little Rock. The majority of the City of North Little Rock's floodplain area is located near the Arkansas River Refer to the map of the flood zones within the City of North Little Rock. The City of North Little Rock is at a **Severe Risk** from flood events.

North Little Rock School District: The boundaries of the North Little Rock School District mirror those of the City of North Little Rock. While the City is subject to riverine and flash flooding, the vast majority of schools are not situated in the AE flood zone**.** The majority of the North Little Rock School District's floodplain area is located near the Arkansas River**;** however, most educational facilities in North Little Rock are located in the uplands of the City. In fact, Lynch Drive Elementary, the one school located in a flood zone is being closed at the end of the 2013-14 school year. There are five new schools being built and all are located outside the 100 year flood zone. Therefore, the North Little Rock School District is at a **Low Risk** from flood events with the exception of the schools shown below located within the boundaries of the School District.

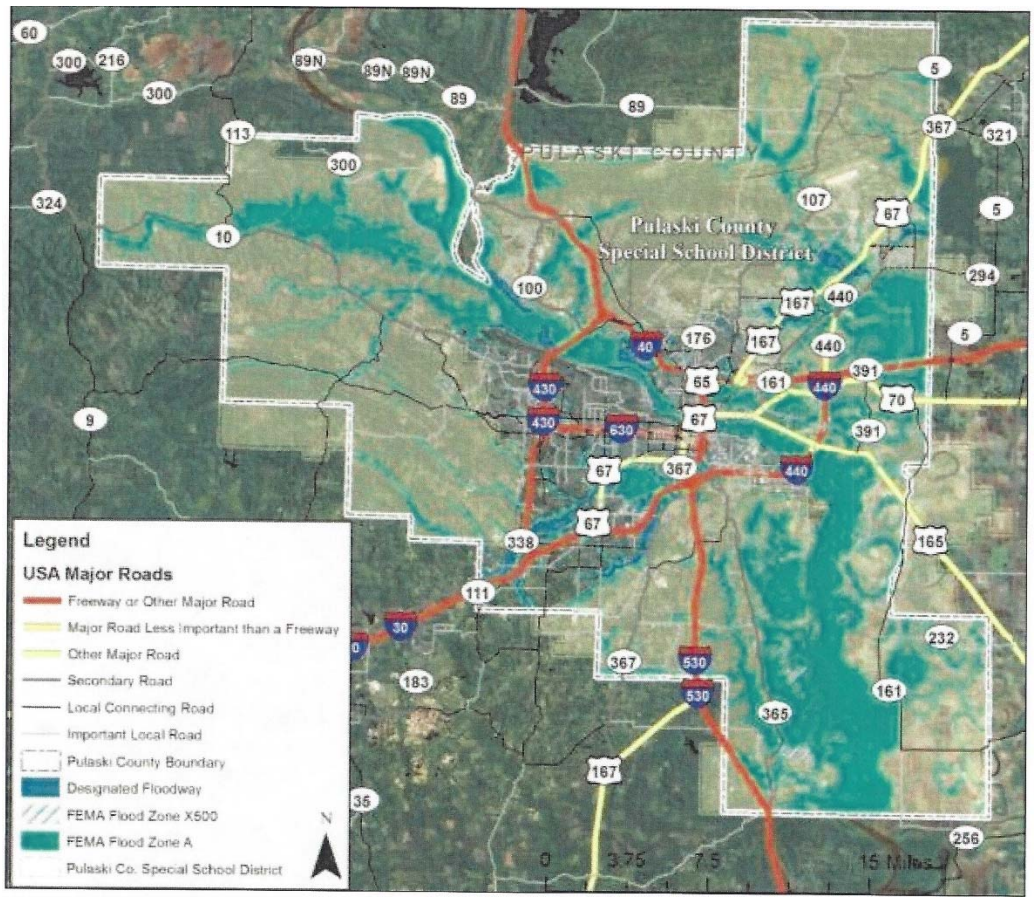
Map of the Floodplain for the City of North Little Rock



Pulaski County Special School District: Refer to the map depicting the vulnerable flood areas in the Pulaski County Special School District. As compared to the Little Rock and North Little Rock school districts, there is a greater chance of flooding. This map bears out this observation; however, as was the case with Little Rock and North Little Rock, the majority of schools are

located on high, dry land out of the 100 -year flood plain. All structures within the AE flood zone are vulnerable to flood. Since the majority of educational facilities, are outside the AE flood zone, Pulaski County Special School District is at **Moderate Risk** from flood.

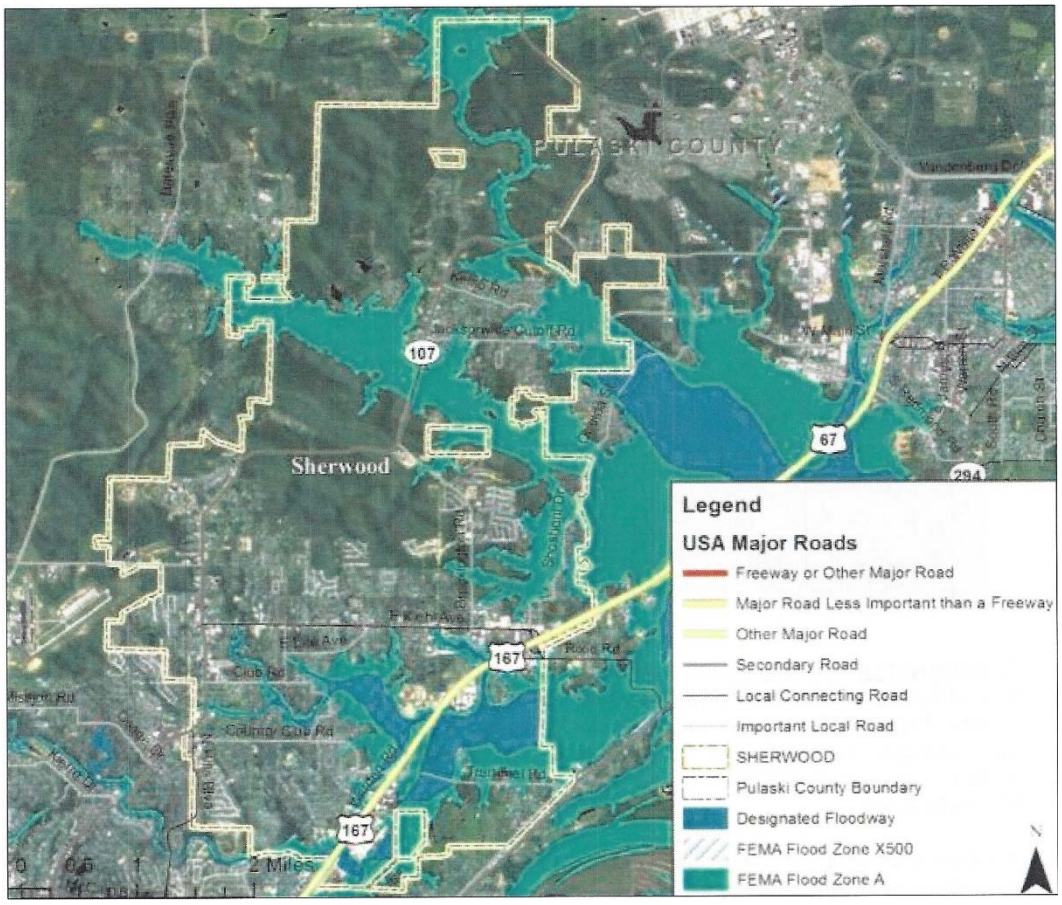
Map of the Floodplain for the Pulaski County Special School District



<u>Sherwood:</u> Seven hundred and forty-eight structures in Sherwood are located in the floodplain. Most of the floodplain lies in the east and southeast and southern parts of the City. Many structures are located within the floodplain east of Indian head Lake near the eastern edge of the City and southeast of U.S. 167 surrounding Rest Hills. Other structures within the floodplain are found near Silver Creek Drive near the southern City boundary and along Bronco Lane and Palomino Drive among other nearby streets near the center of the city. The City has purchased and removed five structures in the floodplain. However, there are numerous other structures that have been repetitively flooded more than four times. The City would like to purchase and raze additional structures as funding becomes available. Another issue involves the Wind Chime Bridge. Not only do the approaches go underwater during heavy rains, but so does the deck of the structure. Another concern is the Jacksonville-Cato Road. It is a critical road connecting Sherwood and Jacksonville. During heavy rains, portions of the roadway become submerged and impassible. Refer to the map of the flood

zones within the City of Sherwood. The City of Sherwood is at a **Severe Risk** from flood events.

Map of the Floodplain for the City of Sherwood



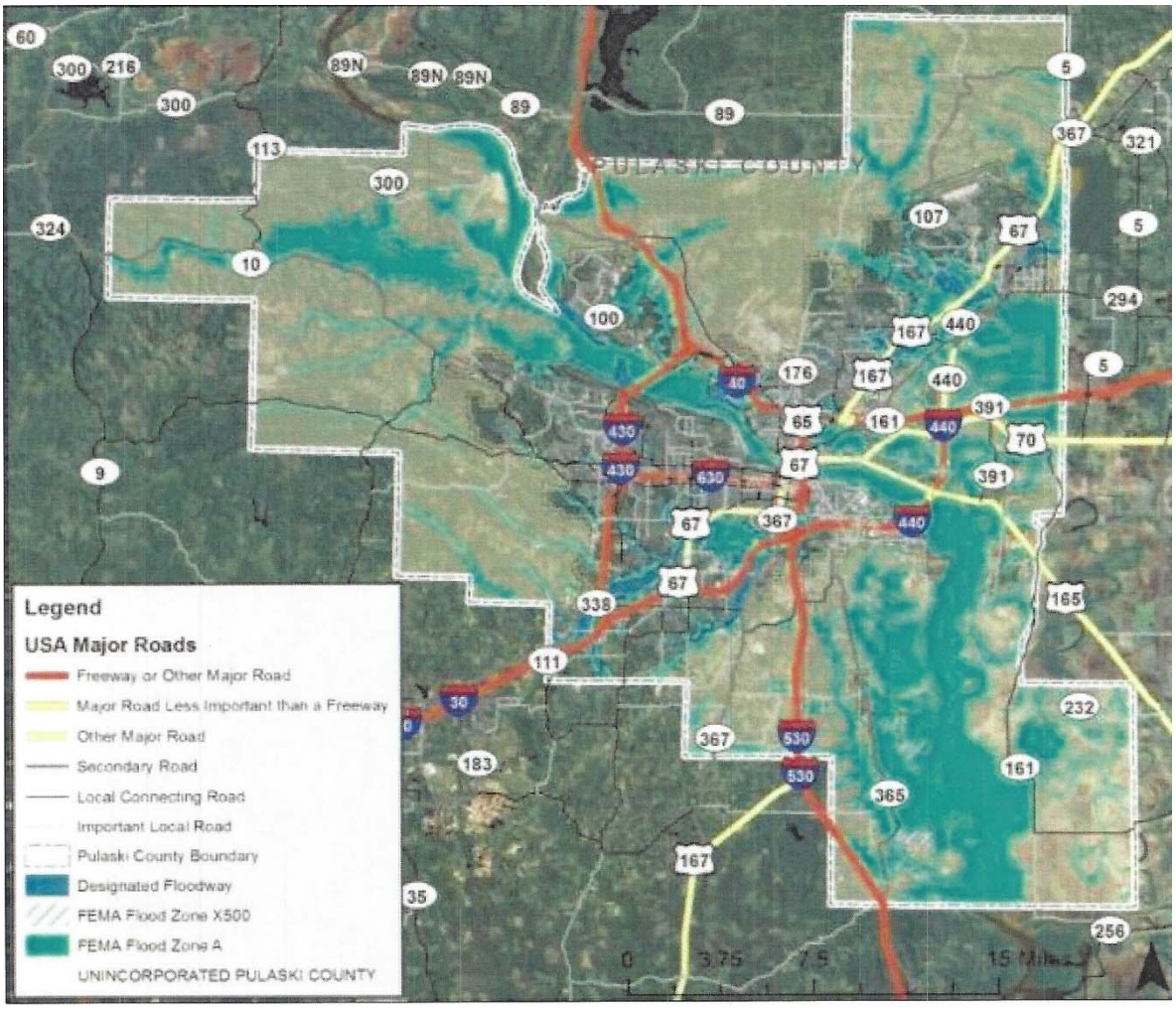
<u>Wrightsville:</u> Five structures in Wrightsville are located within the floodplain. Three structures are along or north of Raney Drive, 1 structure is on Clark Street east of AR 365 and south of AR 386, and one structure lies just west of the end of North Street. No high or significant hazard class dams lie within or upstream from Wrightsville. Refer to the map of the flood zones within the City of Wrightsville. The City of Wrightsville is at a **Moderate Risk** from flood events.

Map of the Floodplain for the City of Wrightsville

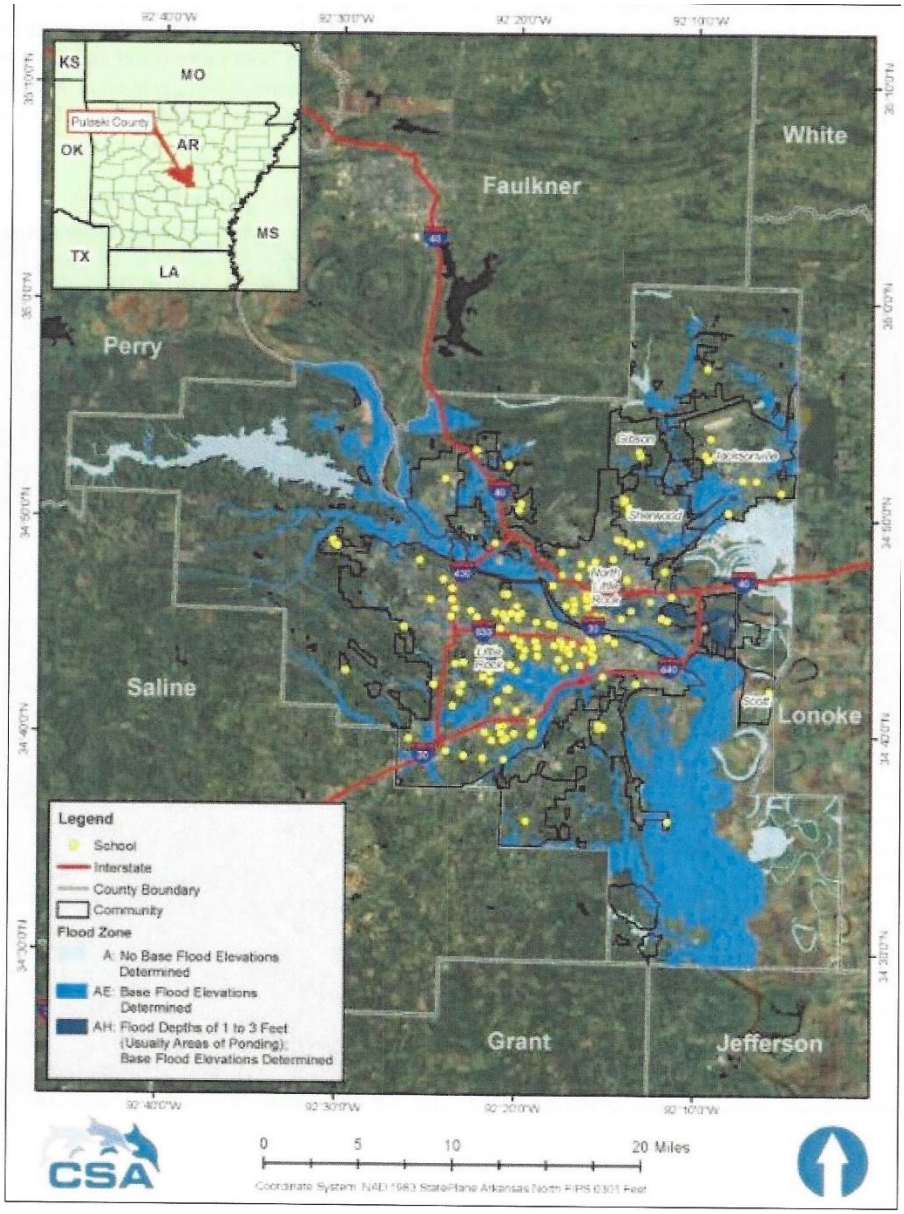
Unincorporated Pulaski County: According to the 2001 Flood Insurance Study for unincorporated Pulaski County, significant flood problems are generally found along highways and roads crossing streams Encroachment into the floodplains has continued in spite of recent flooding. Flood damages are generally limited to houses and commercial buildings that are scattered along streams in the county. Flooding of the Arkansas River is not severe except near the confluence of the Little Maumelle River.

The developed fringe areas adjacent to Faulkner Lake, Five Mile Creek, and Bayou Meto suffer flood damages in residential developments along these streams. Following construction of Interstate 440 north of lnterstate 40 in the eastern and northeastern parts of the county, flooding from wetlands and oxbow lake overflows have been exacerbated. Houses along State Highway 103 are no longer protected from high water. Drainage is easily blocked with debris and beaver dams pose a huge problem. The County contracts to have beavers removed from problem areas. The oxbow lakes and wetlands associated with the Arkansas River in this part of the County hold more water and have not drained as easily in recent years as they have in past years. Communication with property owners in the area has helped define problem areas. Unincorporated Pulaski County is at a **Severe Risk** from flood events.

Map of the Floodplain for Unincorporated Pulaski County



Pulaski County Schools in Flood Risk Areas



Educational Facilities in Pulaski County located in AE Flood Zone

Name	Completely Within AE Flood Zone	Partially within AE Flood Zone*	Jurisdiction
Baseline Baptist Day Care Center	No	Yes	Little Rock
Belwood Elementary School	No	Yes	North Little Rock
Central Arkansas Christian School	No	Yes	North Little Rock
Central Baptist Academy	No	Yes	Little Rock
Fairview Baptist School	No	Yes	Little Rock
Heritage Christian School	Yes	Yes	Little Rock

Little Rock Junior Academy	No	Yes	Unincorporated County
Mann Magnet Middle School	No	Yes	Little Rock
Pathfinder School	No	Yes	Unincorporated County
Roper School	No	Yes	Little Rock
University of Arkansas of Little Rock	No	Yes	Little Rock
* Presented for planning purposes only. User needs to verify precise location of school relative to Flood Zone			

Source: PAgis, 2012 – Previous Pul Co Mit Plan

Previous Occurrences

There have been two Presidential Disaster Declarations within the last ten years.

Presidential Disaster Declarations in Pulaski County from 2010 to current date			
Declaration #	Date	Purpose	Amnt. Obligated for Public Assistance (PA)
DR-4441	6/8/2019	Severe Storm & Flooding	$25,187,569.74
DR1975	5/2/2011	Severe Storms, Tornadoes & Associated Flooding	$49,951,392.96

The conditions listed in the Extent section are determined from previous occurrences.

FLOODs

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	2.000M	500.00K
WOODLAND HGTS	PULASKI CO.	AR	03/13/2015	10:25	CST-6	Flood		0	0	0.00K	0.00K
BOOKER	PULASKI CO.	AR	03/13/2015	11:28	CST-6	Flood		0	0	0.00K	0.00K
(LIT)LITTLE ROCK ADA	PULASKI CO.	AR	12/30/2015	14:40	CST-6	Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	01/01/2016	00:00	CST-6	Flood		0	0	0.00K	0.00K
WOODLAND HGTS	PULASKI CO.	AR	12/22/2017	20:20	CST-6	Flood		0	0	0.00K	0.00K
JACKSONVILLE	PULASKI CO.	AR	12/22/2017	20:20	CST-6	Flood		0	0	0.00K	0.00K
GENEVIA	PULASKI CO.	AR	12/22/2017	21:23	CST-6	Flood		0	0	0.00K	0.00K

JACKSONVILLE	PULASKI CO.	AR	02/21/2018	14:30	CST-6	Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	02/21/2018	16:56	CST-6	Flood		0	0	0.00K	0.00K
LEVY	PULASKI CO.	AR	02/21/2018	19:54	CST-6	Flood		0	0	0.00K	0.00K
TATES MILL	PULASKI CO.	AR	02/23/2018	10:00	CST-6	Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	05/28/2019	14:40	CST-6	Flood		0	0	1.000M	500.00K
HAIG	PULASKI CO.	AR	06/01/2019	00:00	CST-6	Flood		0	0	1.000M	0.00K
Totals:								0	0	2.000M	500.00K

FLASH FLOODS

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	180.00K	0.00K
DIXIE	PULASKI CO.	AR	05/11/2015	03:00	CST-6	Flash Flood		0	0	0.00K	0.00K
NORTH LITTLE ROCK	PULASKI CO.	AR	05/20/2015	05:55	CST-6	Flash Flood		0	0	50.00K	0.00K
TONEYVILLE	PULASKI CO.	AR	05/20/2015	06:00	CST-6	Flash Flood		0	0	0.00K	0.00K
SHERWOOD	PULASKI CO.	AR	05/20/2015	06:45	CST-6	Flash Flood		0	0	0.00K	0.00K
LEVY	PULASKI CO.	AR	11/17/2015	14:44	CST-6	Flash Flood		0	0	0.00K	0.00K
TONEYVILLE	PULASKI CO.	AR	12/28/2015	03:00	CST-6	Flash Flood		0	0	0.00K	0.00K
MARCHE	PULASKI CO.	AR	03/09/2016	16:45	CST-6	Flash Flood		0	0	0.00K	0.00K
CAMMACK VLG	PULASKI CO.	AR	03/30/2016	13:40	CST-6	Flash Flood		0	0	0.00K	0.00K
LEVY	PULASKI CO.	AR	03/30/2016	13:42	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	03/30/2016	14:37	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	03/30/2016	14:40	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	03/30/2016	17:15	CST-6	Flash Flood		0	0	0.00K	0.00K
SHERWOOD	PULASKI CO.	AR	03/30/2016	17:30	CST-6	Flash Flood		0	0	0.00K	0.00K

(ORK)NO LITTLE ROCK ARPT	PULASKI CO.	AR	03/30/2016	18:30	CST-6	Flash Flood		0	0	50.00K	0.00K
HENSLEY	PULASKI CO.	AR	04/29/2016	11:47	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	07/15/2016	18:29	CST-6	Flash Flood		0	0	20.00K	0.00K
PROTHRO JCT	PULASKI CO.	AR	07/15/2016	18:55	CST-6	Flash Flood		0	0	60.00K	0.00K
GIBSON	PULASKI CO.	AR	02/07/2017	05:25	CST-6	Flash Flood		0	0	0.00K	0.00K
GENEVIA	PULASKI CO.	AR	04/17/2017	20:05	CST-6	Flash Flood		0	0	0.00K	0.00K
CYPRESS JCT	PULASKI CO.	AR	04/26/2017	14:46	CST-6	Flash Flood		0	0	0.00K	0.00K
HAIG	PULASKI CO.	AR	04/29/2017	23:15	CST-6	Flash Flood		0	0	0.00K	0.00K
CAMMACK VLG	PULASKI CO.	AR	04/29/2017	23:16	CST-6	Flash Flood		0	0	0.00K	0.00K
SHERWOOD	PULASKI CO.	AR	04/30/2017	00:00	CST-6	Flash Flood		0	0	0.00K	0.00K
(ORK)NO LITTLE ROCK ARPT	PULASKI CO.	AR	04/30/2017	03:50	CST-6	Flash Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	04/30/2017	06:05	CST-6	Flash Flood		0	0	0.00K	0.00K
CAMMACK VLG	PULASKI CO.	AR	05/03/2017	14:25	CST-6	Flash Flood		0	0	0.00K	0.00K
JACKSONVILLE	PULASKI CO.	AR	05/12/2017	16:28	CST-6	Flash Flood		0	0	0.00K	0.00K
PINNACLE	PULASKI CO.	AR	05/20/2017	07:00	CST-6	Flash Flood		0	0	0.00K	0.00K
FERNDALE	PULASKI CO.	AR	06/03/2017	14:34	CST-6	Flash Flood		0	0	0.00K	0.00K
HAIG	PULASKI CO.	AR	07/14/2017	14:29	CST-6	Flash Flood		0	0	0.00K	0.00K
(ORK)NO LITTLE ROCK ARPT	PULASKI CO.	AR	07/14/2017	14:36	CST-6	Flash Flood		0	0	0.00K	0.00K
SHERWOOD	PULASKI CO.	AR	08/18/2017	22:30	CST-6	Flash Flood		0	0	0.00K	0.00K
WOODLAND HGTS	PULASKI CO.	AR	12/22/2017	17:50	CST-6	Flash Flood		0	0	0.00K	0.00K
MARCHE	PULASKI CO.	AR	02/21/2018	08:30	CST-6	Flash Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	02/22/2018	14:23	CST-6	Flash Flood		0	0	0.00K	0.00K

LYNCH	PULASKI CO.	AR	02/24/2018	16:15	CST-6	Flash Flood		0	0	0.00K	0.00K
ROLAND	PULASKI CO.	AR	02/28/2018	20:30	CST-6	Flash Flood		0	0	0.00K	0.00K
CAMMACK VLG	PULASKI CO.	AR	05/23/2018	15:11	CST-6	Flash Flood		0	0	0.00K	0.00K
CAMMACK VLG	PULASKI CO.	AR	05/23/2018	15:15	CST-6	Flash Flood		0	0	0.00K	0.00K
(ORK)NO LITTLE ROCK ARPT	PULASKI CO.	AR	05/23/2018	15:30	CST-6	Flash Flood		0	0	0.00K	0.00K
CAMMACK VLG	PULASKI CO.	AR	05/23/2018	15:35	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	05/23/2018	15:38	CST-6	Flash Flood		0	0	0.00K	0.00K
HALSTEAD	PULASKI CO.	AR	05/23/2018	15:40	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	05/23/2018	15:50	CST-6	Flash Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	05/23/2018	15:56	CST-6	Flash Flood		0	0	0.00K	0.00K
LEVY	PULASKI CO.	AR	05/23/2018	16:00	CST-6	Flash Flood		0	0	0.00K	0.00K
VALENTINE	PULASKI CO.	AR	06/01/2018	20:30	CST-6	Flash Flood		0	0	0.00K	0.00K
MAUMELLE	PULASKI CO.	AR	07/17/2018	18:16	CST-6	Flash Flood		0	0	0.00K	0.00K
PANKEY ADDITION	PULASKI CO.	AR	07/17/2018	18:24	CST-6	Flash Flood		0	0	0.00K	0.00K
VALENTINE	PULASKI CO.	AR	07/17/2018	19:09	CST-6	Flash Flood		0	0	0.00K	0.00K
ROLAND	PULASKI CO.	AR	08/08/2018	08:35	CST-6	Flash Flood		0	0	0.00K	0.00K
MAUMELLE	PULASKI CO.	AR	08/08/2018	15:53	CST-6	Flash Flood		0	0	0.00K	0.00K
DOUGLASVILLE	PULASKI CO.	AR	09/08/2018	16:00	CST-6	Flash Flood		0	0	0.00K	0.00K
HAIG	PULASKI CO.	AR	11/05/2018	17:31	CST-6	Flash Flood		0	0	0.00K	0.00K
TONEYVILLE	PULASKI CO.	AR	12/13/2018	16:20	CST-6	Flash Flood		0	0	0.00K	0.00K
DOUGLASVILLE	PULASKI CO.	AR	04/18/2019	05:08	CST-6	Flash Flood		0	0	0.00K	0.00K
MACON	PULASKI CO.	AR	04/18/2019	07:20	CST-6	Flash Flood		0	0	0.00K	0.00K

LEVY	PULASKI CO.	AR	05/02/2019	12:15	CST-6	Flash Flood		0	0	0.00K	0.00K
HAIG	PULASKI CO.	AR	05/02/2019	13:20	CST-6	Flash Flood		0	0	0.00K	0.00K
LITTLE ROCK	PULASKI CO.	AR	05/02/2019	13:21	CST-6	Flash Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	05/02/2019	13:35	CST-6	Flash Flood		0	0	0.00K	0.00K
WOODLAND HGTS	PULASKI CO.	AR	05/08/2019	18:10	CST-6	Flash Flood		0	0	0.00K	0.00K
MAUMELLE	PULASKI CO.	AR	05/08/2019	18:20	CST-6	Flash Flood		0	0	0.00K	0.00K
HALSTEAD	PULASKI CO.	AR	05/29/2019	17:34	CST-6	Flash Flood		0	0	0.00K	0.00K
HALSTEAD	PULASKI CO.	AR	05/29/2019	17:39	CST-6	Flash Flood		0	0	0.00K	0.00K
FORT ROOTS	PULASKI CO.	AR	05/29/2019	17:52	CST-6	Flash Flood		0	0	0.00K	0.00K
HALSTEAD	PULASKI CO.	AR	05/29/2019	17:52	CST-6	Flash Flood		0	0	0.00K	0.00K
ALEXANDER	PULASKI CO.	AR	05/29/2019	18:16	CST-6	Flash Flood		0	0	0.00K	0.00K
HENSLEY	PULASKI CO.	AR	06/06/2019	22:00	CST-6	Flash Flood		0	0	0.00K	0.00K
LEVY	PULASKI CO.	AR	07/10/2019	17:34	CST-6	Flash Flood		0	0	0.00K	0.00K
WARSAW	PULASKI CO.	AR	08/10/2019	08:50	CST-6	Flash Flood		0	0	0.00K	0.00K
GEYER SPGS	PULASKI CO.	AR	08/10/2019	09:05	CST-6	Flash Flood		0	0	0.00K	0.00K
PULASKI	PULASKI CO.	AR	08/10/2019	10:41	CST-6	Flash Flood		0	0	0.00K	0.00K
Totals:								0	0	180.00K	0.00K

Severe Flooding Pulaski County: Arkansas River Flooding 2019

As June began, it was all about the Arkansas River. After fifteen to twenty inches of rain in May across northeast Oklahoma and southeast Kansas, and massive releases from nearby lakes, the Arkansas River rose to unprecedented levels. Crests in late May/early June were more than two feet above previous high marks at Van Buren (Crawford County), Toad Suck (Perry County), and Pendleton (Desha County).

Arkansas River Flooding

Weather Forecast Office
Little Rock, AR
Issued June 11 2019 9:30 PM CDT

Location	Flood Stage	Crest/Date	Versus Highest Crest On Record	Rank	Record Crest/Year Prior to Event
Van Buren	22.0 ft	40.8 ft/June 1	+2.7 ft	1st	38.1 ft/1945
Ozark	357.0 ft	375.0 ft/May 30	-0.5 ft	2nd	375.5 ft/1943
Dardanelle	32.0 ft	45.9 ft/May 30	+1.8 ft	1st	44.1 ft/1943
Morrilton	30.0 ft	43.0 ft/June 4	+1.0 ft	1st	42.0 ft/1927
Toad Suck	275.0 ft	285.4 ft/June 4	+2.5 ft	1st	282.9 ft/1990
Little Rock	23.0 ft	29.7 ft/June 5	-4.9 ft	7th	34.6 ft/1833
Pine Bluff	42.0 ft	50.8 ft/June 6	-1.3 ft	2nd	52.1 ft/1943
Pendleton	31.0 ft	37.6 ft/June 6	+3.5 ft	1st	34.1 ft/1973

An historic flood event unfolded along the Arkansas River. Record or near record crests occurred, with previous high marks surpassed by more than two feet at Van Buren (Crawford County), Toad Suck (Perry County), and Pendleton (Desha County). Some long time records (1940s or before) were broken.

NWSLittle Rock weather.gov/lzk

Along the river, major flooding was experienced for almost two weeks in places through June 4th. Water this high for an extended period put levees to the test, and threatened hundreds of homes and businesses.

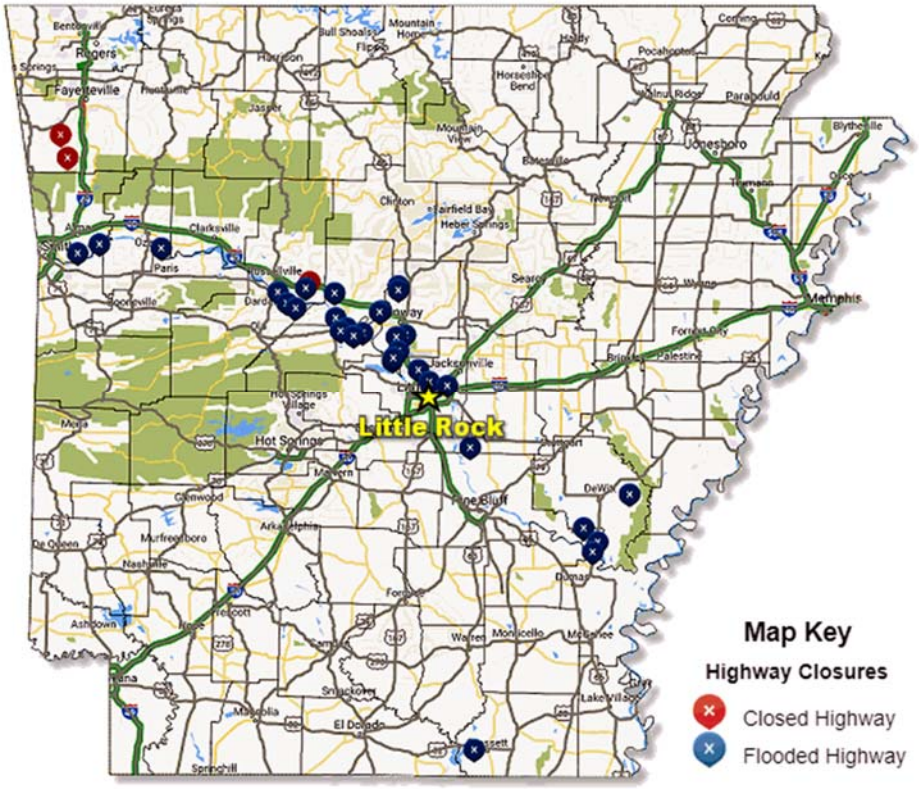
Consecutive Days Above Flood Stage

National Weather Service Little Rock Arkansas

Current data as of June 4th 2019

Location	Minor (Days/Period)	Moderate (Days/Period)	Major (Days/Period)
Van Buren	14 May 22nd - Today	14 Late May 22nd - Today	13 Late May 23rd - Today
Ozark	14 Late May 22nd - Today	12 Early May 24th - Today	12 May 24th - Today
Dardanelle	12 Late May 24th - Today	11 Late May 25th - Today	9 Early May 27th - Today
Morrilton	12 May 24th - Today	11 May 25th - Today	9 Early May 27th - Today
Toad Suck	11 May 25th - Today	10 Late May 26th - Today	9 May 27th - Today
Little Rock	8 May 28th - Today	7 Late May 29th - Today	5 Early May 31st - Today
Pine Bluff	10 Late May 26th - Today	8 Early May 28th - Today	8 Late May 28th - Today
Pendleton	8 Late May 28th - Today	6 May 30th - Today	6 Late May 30th - Today

Numerous highways were closed and flooded. This included Highway 22 near Barling (Sebastian County), which did not open until water receded on the 4th (after cresting on the 1st). A 64-year-old man lost his life on this highway on May 28th after driving around a barricad



In the photo: Water from the Arkansas River was flooding homes near Two Rivers Park about eight miles northwest of Little Rock (Pulaski County) on **05/29/2019**. The video/photo is courtesy of the Arkansas State Police.

Flooding in area of North Little Rock raises late-night levee alert

*by **Stephen Simpson**, **Clara Turnage** | June 1, 2019 at 4:30 a.m.*

John Sehika (left) and Todd Nebling with the North Little Rock Street Department work Friday morning installing the floodgates to one of the entrances to the North Shore Riverwalk Park. (Arkansas Democrat-Gazette / Staton Breidenthal)

Flooding in an industrial area on North Little Rock's southeastern side late Friday raised concerns about a levee and prompted a National Weather Service flash-flood warning that was later canceled.
Lance Pyle, a meteorologist with the National Weather Service in North Little Rock, said the levee is near the 3200 block of Gribble Street south of U.S. 70, about 2 miles east of Interstate 30.

Pulaski County has issues with reoccurring flooding in Taylor Creek and feel that a study of the Watershed is needed to determine baseline for sustainable development and needs for drainage capacity improvements.

There is an issue with repetitive flooding of the property on Jim Hall Road in Pulaski County

North Little Rock has several areas that need more data to better manage the special flood hazard areas. A Hydraulic engineering study for Five-Mile Creek/Shilcott Bayou is needed to determine drainage improvements and associated costs to mitigate repetitive flooding. The same is needed for the Redwood Tunnel Drainage System as well at State Highway 161 and Bethany.

Jacksonville has identified there is repetitive flooding in the Northlake subdivision which could be mitigated by elevating and extending Oneida Street north to Jacksonville Cut Off Road.

Sherwood has two sections of road that continually flood with any significant rainfall. Jacksonville Cato Road and Wind Chime Bridge. Elevating the roads and offering to buy-out property is needed to mitigate the flooding.

Probability of Future Events

Flood Return Intervals	Chance of Occurrence in Any Given Year
10-Year	10%
50-Year	2%
100-Year	1%
500-Year	0.2%

Based on previous occurrences, the planning area is likely to see14.6 flash flood events per year, so the probability of a flash flood event is 146% in any given year. The planning area is likely to see 2.6 Flood events per year, or a 260% chance of flooding in any given year.

Impact and Vulnerability

Arkansas Natural Resources Commission under Cooperating Technical Partner (CTP) with FEMA completed the full Risk MAP following non-regulatory risk assessment products of "Flood Risk Map", "Flood Risk Report," and "Flood Risk Database" were made available:

1. Lower Arkansas - Maumelle Watershed (10/10/2013) covering Cammack Village, City of Little Rock, City of Maumelle, City of North Little Rock, City of Wrightsville and Unincorporated areas of Pulaski County
2. Bayou Meto Watershed (12/17/2017) covering City of Jacksonville, City of Sherwood and Unincorporated areas of Pulaski County
3. Lake Conway – Point Remove Watershed (09/01/2015) covering unincorporated areas of Pulaski County.
4. Upper Saline Watershed (12/23/2015) covering unincorporated areas of Pulaski County.

There are numerous ways that flooding could impact Pulaski County. Flooding causes problems by cutting off streets, collapsing overpasses and bridges and causing traffic-light failures. Cars may stall and can even be carried off by flood waters. Flood waters interrupt gas, electricity and water services and contaminate the water supply, making drinkable water unavailable. Transportation systems may go off-line because buses, cars and trucks can't navigate the high water.

People can die in floods when their autos and homes are overtaken quickly by fast-rising flood waters. Homes, personal belongings and businesses can be damaged or lost entirely as a result of ravages of flooding. People may be unable to get to work, creating a loss of income and a lack of services they would provide. Listed below are other means in which flooding can affect Pulaski County:

Environmental- Flat areas that do not have trees or rocks to prevent erosion are often swept away. Farm fields, which typically are located in flat areas, become washed out and crops are lost. Contaminants from sewer back-ups and other waste may be washed into the water supply, resulting in water that is unsafe for residents to use. The shelters of animals in the area are also washed out, resulting in many homeless animals that can cause problems for their owners.

Economic- Residential loss or repair could have an impact. Businesses also suffer, not only from the loss of property, but the lack of customers during the flood and for a while during recovery. Farmers also suffer from the loss of their crops.

Financial- Some residents who do not carry flood insurance suffer a great financial hardship. Those who do not have insurance get help with the clean-up, but some costs may still come out of pocket. Towns and cities that are impacted by flood carry the financial burden of fixing the public buildings, roads and other structures damaged by the flood waters. People who are impacted by the flood may also lose wages because the business they work for suffered damages or they are unable to get to work.

Health- Flood waters can also damage the health of those living and working in the area. Because flood waters can wash dangerous waste into water supplies, tap water may become unsafe to use if the local authorities do not issue a boil advisory warning everyone to boil water before ingesting it. Mold is also likely to grow in homes and other buildings that were engulfed by the flood waters. It is important to search all homes for mold and remove it completely before moving back in. Breathing the mold spores is dangerous for your health. A flood can also contribute to other health problems from human waste that contaminates the ground.

Safety- Once flooding begins, strong currents can pull a grown man beneath the water to drown. Once the flood waters have settled, it is still unsafe to wander through the water by car or on foot. Deep spots may be undetectable and there may be electric currents running through the water as well. Low spots on County roads, city roads and state highways are vulnerable to flooding in Pulaski County.

Soil- Flooding results in poor soil aeration, leading to poor plant growth. Soil becomes more acidic following flooding. In addition, flooding can lead to soil erosion or soil contamination from such man-made pollutants as oils (on roadways), fertilizers (in yards and farms) and paints.

Rural Impact- Floods damage farmland by burying crops in silt, uprooting crops by the force of the water or drowning crops. Flood waters can drown livestock as well. Flooding devastates wetlands and other wildlife habitats by depositing massive amounts of silt or leaving behind toxic substances such as petroleum products, fertilizers and pesticides and other man-made chemicals. This can kill animals and lead to water and land pollution.

Disease- Flooding increases human exposure to dysentery and other diseases. Flooded sewage treatment plants contaminate drinking water supplies. Contaminated drinking water is a greater problem in developing countries.

Data is available from a HAZUS run for those parts of the planning area that are in the Lower Arkansas – Maumelle Watershed which included: Cammack Village, Little Rock, Maumelle, North Little Rock,

Wrightsville and a portion of unincorporated Pulaski County. Bayou Meto Watershed Risk Assessment included: Jacksonville and Sherwood and a portion of unincorporated Pulaski County.

Tables from Lower Arkansas - Maumelle Watershed:

			City of Cammack Village Estimated Potential Losses for Flood Event Scenarios									
	Total Inventory		10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$170,100,000	91%	$0	0.0%	$0	0.0%	$0	0.0%	$10,000	0.0%	$0	0.0%
Commercial Building/Contents	$6,500,000	4%	$0	0.0%	$10,000	0.2%	$20,000	0.3%	$20,000	0.3%	$0	0.0%
Other Building/Contents	$9,800,000	5%	$0	0.0%	$0	0.0%	$0	0.0%	$0	0.0%	$0	0.0%
Total Building/Contents[2]	$186,400,000	100%	$0	0.0%	$10,000	0.0%	$20,000	0.0%	$30,000	0.0%	$0	0.0%
Business Disruption[3]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[4]	$186,400,000	N/A	$0	0.0%	$10,000	0.0%	$20,000	0.0%	$30,000	0.0%	$0	0.0%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios are rounded to nearest tenth for values under 1% and to the nearest percent for values over 1%.

			City of Little Rock Estimated Potential Losses for Flood Event Scenarios									
	Total Inventory		10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$27,812,400,000	58%	$104,600,000	0.4%	$165,400,000	0.6%	$233,800,000	0.8%	$445,600,000	2.0%	$15,800,000	0.1%
Commercial Building/Contents	$14,990,200,000	31%	$145,800,000	1.0%	$288,800,000	2.0%	$336,900,000	2.0%	$579,100,000	4.0%	$23,100,000	0.2%
Other Building/Contents	$5,146,500,000	11%	$48,600,000	0.9%	$89,900,000	2.0%	$109,200,000	2.0%	$195,000,000	4.0%	$7,500,000	0.1%
Total Building/Contents[2]	$47,949,200,000	100%	$299,000,000	0.6%	$544,100,000	1.0%	$679,900,000	1.0%	$1,219,700,000	3.0%	$46,400,000	0.1%
Business Disruption[3]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[4]	$47,949,200,000	N/A	$299,000,000	0.6%	$544,100,000	1.0%	$679,900,000	1.0%	$1,219,700,000	3.0%	$46,400,000	0.1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios are rounded to nearest tenth for values under 1% and to the nearest percent for values over 1%.

			City of Maumelle Estimated Potential Losses for Flood Event Scenarios									
	Total Inventory		10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$3,269,800,000	91%	$17,400,000	0.5%	$57,300,000	2.0%	$70,900,000	2.0%	$130,600,000	4.0%	$4,000,000	0.1%
Commercial Building/Contents	$225,300,000	6%	$1,900,000	0.8%	$4,700,000	2.0%	$5,700,000	3.0%	$10,000,000	4.0%	$300,000	0.1%
Other Building/Contents	$110,900,000	3%	$500,000	0.5%	$1,700,000	2.0%	$2,000,000	2.0%	$3,400,000	3.0%	$100,000	0.1%
Total Building/Contents[2]	$3,606,000,000	100%	$19,800,000	0.5%	$63,700,000	2.0%	$78,600,000	2.0%	$144,000,000	4.0%	$4,400,000	0.1%
Business Disruption[3]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[4]	$3,606,000,000	N/A	$19,800,000	0.5%	$63,700,000	2.0%	$78,600,000	2.0%	$144,000,000	4.0%	$4,400,000	0.1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios are rounded to nearest tenth for values under 1% and to the nearest percent for values over 1%.

	Total Inventory		City of North Little Rock Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$6,358,100,000	69%	$10,900,000	0.2%	$24,600,000	0.4%	$32,000,000	0.5%	$89,800,000	1.0%	$2,100,000	0.0%
Commercial Building/Contents	$1,923,200,000	21%	$16,900,000	0.9%	$49,800,000	3.0%	$65,400,000	3.0%	$128,900,000	7.0%	$3,700,000	0.2%
Other Building/Contents	$897,600,000	10%	$6,400,000	0.7%	$17,900,000	2.0%	$25,400,000	3.0%	$58,100,000	6.0%	$1,400,000	0.2%
Total Building/Contents[2]	$9,178,900,000	100%	$34,200,000	0.4%	$92,300,000	1.0%	$122,800,000	1.0%	$276,800,000	3.0%	$7,200,000	0.1%
Business Disruption[3]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[4]	$9,178,900,000	N/A	$34,200,000	0.4%	$92,300,000	1.0%	$122,800,000	1.0%	$276,800,000	3.0%	$7,200,000	0.1%

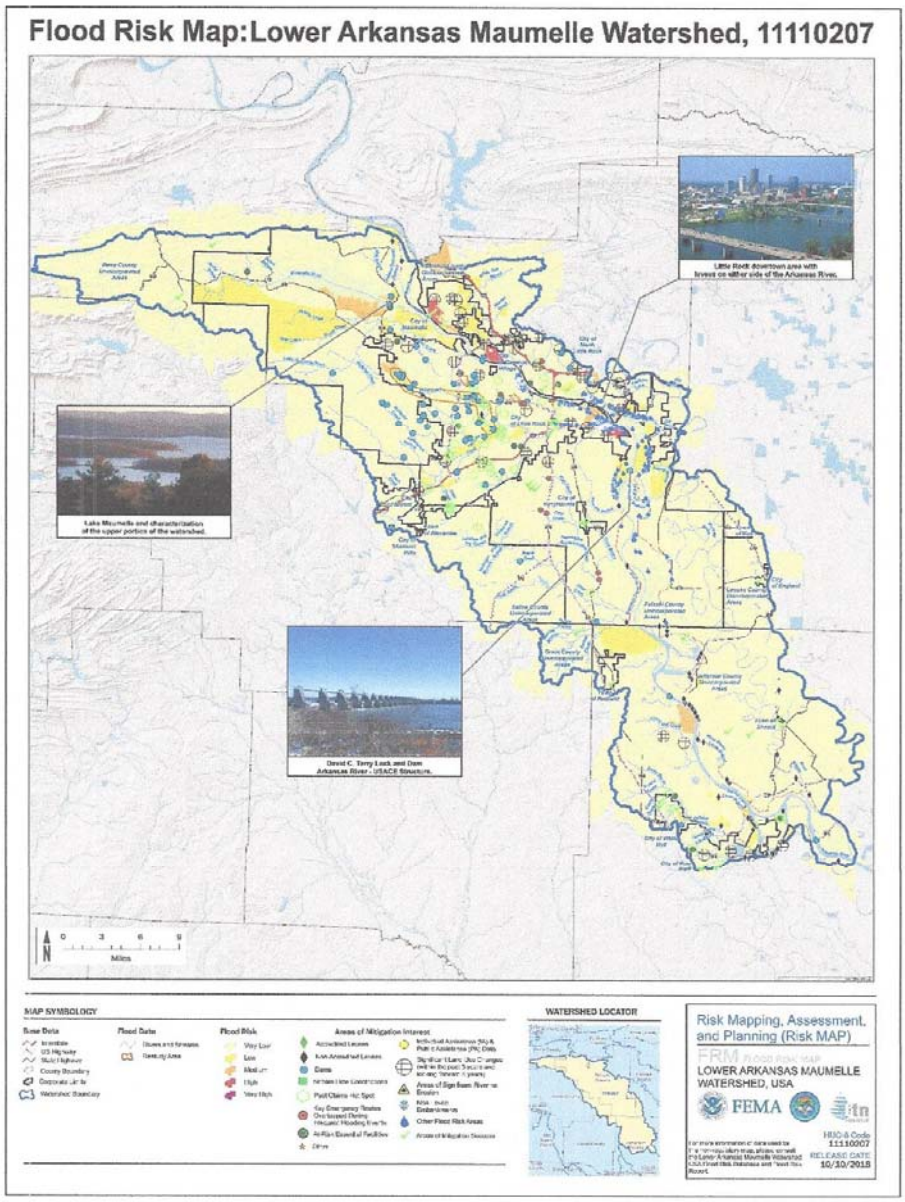
Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios are rounded to nearest tenth for values under 1% and to the nearest percent for values over 1%.

	Total Inventory		City of Wrightsville Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$100,600,000	83%	$30,000	0.0%	$100,000	0.1%	$100,000	0.1%	$600,000	0.6%	$10,000	0.0%
Commercial Building/Contents	$10,200,000	8%	$0	0.0%	$0	0.0%	$10,000	0.1%	$30,000	0.3%	$0	0.0%
Other Building/Contents	$10,200,000	8%	$0	0.0%	$0	0.0%	$0	0.0%	$20,000	0.2%	$0	0.0%
Total Building/Contents[2]	$121,000,000	100%	$30,000	0.0%	$100,000	0.1%	$100,000	0.1%	$700,000	0.6%	$10,000	0.0%
Business Disruption[3]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[4]	$121,000,000	N/A	$30,000	0.0%	$100,000	0.1%	$100,000	0.1%	$700,000	0.6%	$10,000	0.0%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios are rounded to nearest tenth for values under 1% and to the nearest percent for values over 1%.

	Total Inventory		Pulaski County Unincorporated Areas Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$3,805,500,000	77%	$44,100,000	1.0%	$74,800,000	2.0%	$89,100,000	2.0%	$137,700,000	4.0%	$6,300,000	0.2%
Commercial Building/Contents	$618,200,000	13%	$8,200,000	1.0%	$14,500,000	2.0%	$18,000,000	3.0%	$32,100,000	5.0%	$1,100,000	0.2%
Other Building/Contents	$525,200,000	11%	$6,500,000	1.0%	$11,000,000	2.0%	$13,000,000	2.0%	$22,200,000	4.0%	$900,000	0.2%
Total Building/Contents[2]	$4,949,000,000	100%	$58,800,000	1.0%	$100,300,000	2.0%	$120,100,000	2.0%	$192,000,000	4.0%	$8,300,000	0.2%
Business Disruption[3]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[4]	$4,949,000,000	N/A	$58,800,000	1.0%	$100,300,000	2.0%	$120,100,000	2.0%	$192,000,000	4.0%	$8,300,000	0.2%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios are rounded to nearest tenth for values under 1% and to the nearest percent for values over 1%.


Flood Risk Map:Lower Arkansas Maumelle Watershed, 11110207
Little Rock downtown area with
Lake Maumelle and characterization
David C. Terry Lock and Dam
Miles
MAP SYMBOLOGY
WATERSHED LOCATOR
Risk Mapping, Assessment, and Planning (Risk MAP)
LOWER ARKANSAS MAUMELLE WATERSHED, USA
FEMA
HUC-8 Code
11110207
RELEASE DATE
10/10/2018

Sherwood

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$2,598,200,000	81%	$14,500,000	1%	$21,800,000	1%	$24,100,000	1%	$33,400,000	1%	$1,900,000	N/A
Commercial Building/Contents	$452,400,000	14%	$7,300,000	2%	$9,700,000	2%	$10,700,000	2%	$13,300,000	3%	$900,000	N/A
Other Building/Contents	$156,100,000	5%	$2,700,000	2%	$3,600,000	2%	$4,000,000	3%	$4,900,000	3%	$300,000	N/A
Total Building/Contents[2]	$3,206,800,000	100%	$24,400,000	1%	$35,100,000	1%	$38,800,000	1%	$51,700,000	2%	$3,100,000	N/A
Business Disruption[3]	$0	N/A	$1,000,000	N/A	$1,300,000	N/A	$1,400,000	N/A	$1,700,000	N/A	$100,000	N/A
TOTAL[4]	$3,206,800,000	N/A	$25,400,000	1%	$36,400,000	1%	$40,200,000	1%	$53,400,000	2%	$3,200,000	N/A

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios rounded to nearest integer percent.

Jacksonville

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$2,492,200,000	77%	$14,700,000	1%	$20,700,000	1%	$22,000,000	1%	$26,200,000	1%	$1,900,000	< 1%
Commercial Building/Contents	$440,500,000	14%	$3,800,000	1%	$5,200,000	1%	$5,600,000	1%	$6,600,000	1%	$500,000	< 1%
Other Building/Contents	$300,700,000	9%	$4,100,000	1%	$5,300,000	2%	$5,800,000	2%	$6,800,000	2%	$500,000	< 1%
Total Building/Contents[2]	$3,233,400,000	100%	$22,700,000	1%	$31,200,000	1%	$33,400,000	1%	$39,600,000	1%	$2,800,000	< 1%
Business Disruption[3]	$0	N/A	$1,100,000	N/A	$1,400,000	N/A	$1,500,000	N/A	$1,800,000	N/A	$100,000	N/A
TOTAL[4]	$3,233,400,000	N/A	$23,800,000	1%	$32,600,000	1%	$35,000,000	1%	$41,400,000	1%	$2,900,000	< 1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios rounded to nearest integer percent.

Pulaski County

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$1,157,400,000	83%	$8,900,000	1%	$12,600,000	1%	$13,400,000	1%	$16,400,000	1%	$1,100,000	N/A
Commercial Building/Contents	$148,500,000	11%	$2,700,000	2%	$3,700,000	2%	$3,900,000	3%	$4,700,000	3%	$300,000	N/A
Other Building/Contents	$92,000,000	7%	$1,200,000	1%	$1,600,000	2%	$1,700,000	2%	$2,100,000	2%	$100,000	N/A
Total Building/Contents[2]	$1,397,900,000	100%	$12,900,000	1%	$17,900,000	1%	$19,000,000	1%	$23,200,000	2%	$1,600,000	N/A
Business Disruption[3]	$0	N/A	$400,000	N/A	$500,000	N/A	$500,000	N/A	$600,000	N/A	$30,000	N/A
TOTAL[4]	$1,397,900,000	N/A	$13,300,000	1%	$18,400,000	1%	$19,600,000	1%	$23,900,000	2%	$1,600,000	N/A

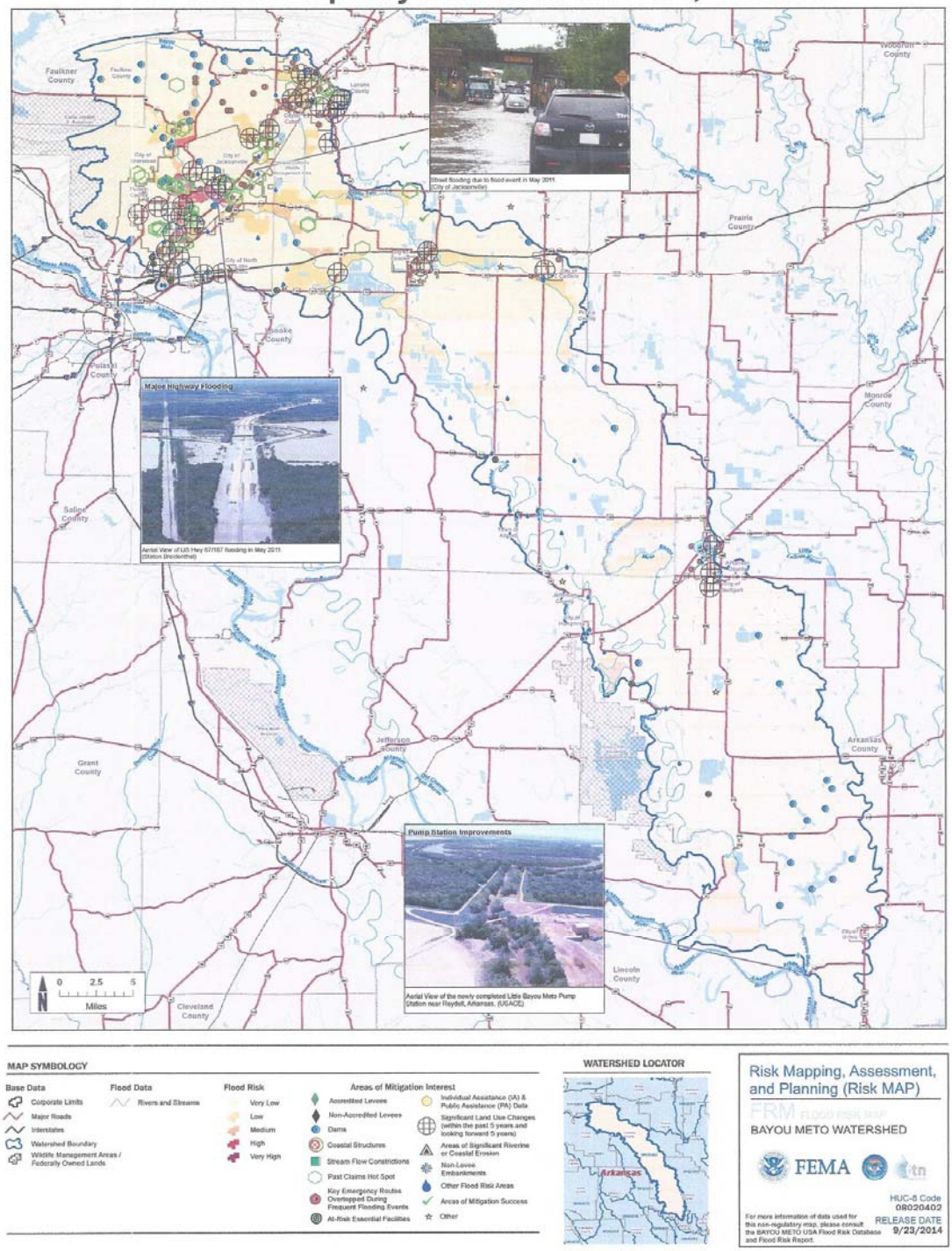
Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios rounded to nearest integer percent.

North Little Rock

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]	Dollar Losses[5]	Loss Ratio[1,6]
Residential Building/Contents	$1,443,400,000	70%	$14,100,000	1%	$16,200,000	1%	$17,000,000	1%	$21,000,000	1%	$1,600,000	N/A
Commercial Building/Contents	$443,500,000	22%	$2,600,000	1%	$3,400,000	1%	$4,100,000	1%	$4,700,000	1%	$300,000	N/A
Other Building/Contents	$168,700,000	8%	$2,600,000	2%	$3,400,000	2%	$3,900,000	2%	$4,600,000	3%	$300,000	N/A
Total Building/Contents[2]	$2,055,600,000	100%	$19,300,000	1%	$23,000,000	1%	$25,000,000	1%	$30,200,000	1%	$2,200,000	N/A
Business Disruption[3]	$0	N/A	$900,000	N/A	$1,100,000	N/A	$1,300,000	N/A	$1,400,000	N/A	$90,000	N/A
TOTAL[4]	$2,055,600,000	N/A	$20,200,000	1%	$24,100,000	1%	$26,300,000	1%	$31,600,000	2%	$2,300,000	N/A

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Loss ratio = Dollar Losses / Estimated Value
[2]Total Building/Contents Loss = Residential Building/Contents Loss + Commercial Building/Contents Loss + Other Building/Contents Loss.
[3]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[4]Total Loss = Total Building/Contents + Business Disruption
[5]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[6]Loss Ratios rounded to nearest integer percent.

Flood Risk Map: *Bayou Meto Watershed, 08020402*



The above maps are from the "Flood Risk Report" for the Lower Arkansas – Maumelle Report Number 2, dated 12/17/2015 & Bayou Meto Report dated 12/17/2015, produced as part of FEMA's Risk MAP program. It indicates that there is a "very low" flood risk for all the cities within Pulaski County.

3.4.6 Addressing Repetitive Loss Properties

Please see Section 2.2.2 for greater detail of each jurisdiction's participation in the NFIP.

Per 2015 HMA Guidance, a severe repetitive loss property is a structure that:

(a) Is covered under a contract for flood insurance made available under the NFIP

(b) Has incurred flood related damage -

i. For which 4 or more separate claims payments (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and which the cumulative amount of such claims payments exceeding $20,000

OR

ii. For which at least 2 separate claims payments (includes only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

A **repetitive loss property** is a structure covered by a contract for flood insurance made available under the NFIP that:

(a) Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event

AND

(b) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage

Inventory of Repetitive Loss Structures by Community

Community Name (Number)	RL Bldgs Total	RL Buildings Insured	Total Losses	RL Losses Insured	Total Loss Amount	Total Loss Amount Insured	Properties w/4 + Losses	Properties w/ 4 + Losses Insured	Properties w/ 2-3 Losses > Total Value	Properties w/ 2-3 Losses > Insured Value	Building Post-Firm A-V Zone	Building Post-Firm A-V Zone Insured
LITTLE ROCK, CITY OF (050181)	61	26	200	91	7,168,457.75	5,578,038.26	20	10	0	0	0	0
NORTH LITTLE ROCK, CITY OF (050182)	15	13	35	31	1,328,127.19	1,281,090.51	1	1	0	0	0	0
JACKSONVILLE, CITY OF (050180)	10	3	24	9	$520,122.37	$137,400.06	1	1	0	0	0	0
PULASKI COUNTY * (050179)	40	21	98	50	3,400,034.42	1,899,707.53	3	2	0	0	0	0
SHERWOOD, CITY OF (050235)	24	17	65	45	1,057,333.42	866,136.89	3	2	0	0	0	0
	150	**80**	**422**	**226**	**13,474,075.15**	**9,762,373.25**	**28**	**16**	**0**	**0**	**0**	**0**

Pulaski County RL Summary as of 06-30-2019:

Community Name	NFIP_RL_ Mitigated?	NFIP_RL_ Mitigated?	nfip_rl_ losses	nfip_rl_bldg_ paid	nfip_rl_contents_paid	nfip_rl_total_paid
		165	470	$10,791,074.11	$3,403,271.84	$14,194,345.95
JACKSONVILLE, CITY OF		11	26	$443,215.84	$80,495.19	$523,711.03
	NO	10	24	$440,331.18	$79,791.19	$520,122.37
	YES	1	2	$2,884.66	$704.00	$3,588.66
LITTLE ROCK, CITY OF		73	237	$4,831,078.83	$2,731,439.67	$7,562,518.50
	NO	61	199	$4,520,267.56	$2,525,720.03	$7,045,987.59
	YES	12	38	$310,811.27	$205,719.64	$516,530.91
NORTH LITTLE ROCK, CITY OF		16	41	$1,454,079.93	$63,452.34	$1,517,532.27
	NO	12	28	$1,081,429.58	$34,364.69	$1,115,794.27

	YES	4	13	$372,650.35	$29,087.65	$401,738.00
PULASKI COUNTY *		35	84	$2,360,415.09	$443,741.38	$2,804,156.47
	NO	34	82	$2,360,415.09	$436,366.94	$2,796,782.03
	YES	1	2	$0.00	$7,374.44	$7,374.44
SHERWOOD, CITY OF		30	82	$1,702,284.42	$84,143.26	$1,786,427.68
	NO	24	65	$1,018,002.11	$39,331.31	$1,057,333.42
	YES	6	17	$684,282.31	$44,811.95	$729,094.26
		165	470	$10,791,074.11	$3,403,271.84	$14,194,345.95

Pulaski County V-SRL Summary as of 06-30-2019:

Community Name	NFIP_RL_ Mitigated?	SRL Properties	srl_losses	srl_bldg_paid	srl_contents_paid	srl_total_paid
		5	23	$623,930.72	$152,921.53	$776,852.25
LITTLE ROCK, CITY OF		4	19	$428,899.76	$46,438.62	$475,338.38
	NO	4	19	$428,899.76	$46,438.62	$475,338.38
PULASKI COUNTY *		1	4	$195,030.96	$106,482.91	$301,513.87
	NO	1	4	$195,030.96	$106,482.91	$301,513.87
		5	23	$623,930.72	$152,921.53	$776,852.25

3.4.7 Thunderstorms

A thunderstorm, also known as an **electrical storm, a lightning storm**, **thundershower** or simply a **storm,** is a form of turbulent weather characterized by the presence of lightning and its acoustic effect on the Earth's atmosphere known as thunder. The meteorologically assigned cloud type associated with the thunderstorm is the cumulonimbus. Thunderstorms are usually accompanied by strong winds, heavy rain and sometimes snow, sleet, hail, or no precipitation at all. Those that cause hail to fall are called hailstorms. Thunderstorms may line up in a series or rain bands, known as a squall line. Strong or severe thunderstorms may rotate, known as supercells. While most thunderstorms move with the mean wind flow through the layer of the troposphere that they occupy, vertical wind shear causes a deviation in their course at a right angle to the wind shear direction.

Lightning- Lightning is a channel of electrical charge called a stepped leader that zigzags downward in roughly 50-yard segments in a forked pattern. This step leader is invisible to the human eye, and shoots to the ground in less time than it takes to blink. As it nears the ground, the charged step leader is attracted to a channel of opposite charge reaching up, a streamer, normally through something tall, such as a tree, house, or telephone pole. When the oppositely-charged leader and streamer connect, a powerful electrical current begins flowing. A bright return stroke travels about 60,000 miles per second back towards the cloud. A flash consists of one or perhaps as many as 20 return strokes. We see lightning flicker when the process rapidly repeats itself several times along the same path. The actual diameter of a lightning channel is one-to-two inches.

Hail- Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people.

According to data from the FEMA 1997 publication “Multi-Hazard - Identification and Risk Assessment,” Arkansas is within a part of the country that averages two to three hailstorms annually.

Strong Winds- Damaging winds are often called “straight-line” winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Most thunderstorm winds that cause damage at the ground are a result of outflow generated by a thunderstorm downdraft. Damaging winds are classified as those exceeding 50-60 mph.

Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles.

Location

All areas of the planning area will experience thunderstorm events and are equally at risk.

Extent

The entire planning area is subject to thunderstorms ranging from weak to extreme that includes up to a T-5 on the chart below.

Modified Extreme Weather Madness Thunderstorm Criteria published by AccuWeather:

THUNDERSTORM CRITERIA							
THUNDERSTORM TYPES	RAINFALL RATE/HR	MAX WIND GUST	HAIL SIZE	PEAK TORNADO	LIGHTNING FREQUENCY	DARKNESS FACTOR	STORM IMPACT
T-1 Weak Thunderstorms or Thundershowers	.03" .10"	25 MPH	None	None	Only a few strikes during the storm	Slightly Dark. Sunlight may be seen under the storm.	1. No Damage 2. Gusty Winds at times
T-2 Moderate Thunderstorms	.10" .25"	25-40 MPH	None	None	Occasional 1 -10	Moderately Dark. Heavy downpours may cause the need for car lights.	1. Heavy Downpours. 2. Occasional lightning. 3. Gusty winds. 4.Very little damage. 5. Small tree branches may break. 6. Lawn furniture moved around
T-3 Heavy Thunderstorms 1. Singular or lines of storms	.25" .55"	40-57 MPH	1/4"-3/4"	EF 0	Occasional to Frequent 10-20	Dark. Car lights used. Visibility low in heavy rains.	1. Minor Damage 2. Downpours that produce some flooding. 3. Frequent lightning 4. Hail occurs with the downpours 5. Small branches are broken. 6. Shingles are blown off roofs.
T-4 Intense Thunderstorms 1. Weaker Supercells 2. Bow echos or lines of storms	.55" 1.25"	57-70 MPH	1" - 1.5"	EF 0 to EF 2	Frequent 20-30	Very Dark. Car lights are used and street lights come on.	1. Moderate Damage 2. Heavy rains can cause flooding to streams, creeks, and roadways. 3. Wind damage to trees and buildings 4. Tornado damage 5. Power outages
T-5 Extreme Thunderstorms 1. Supercells with family of tornadoes 2. Derecho Windstorms	1.25" 4"	Over 70 MPH	Over 1.5" to 4"	EF 3 to EF5	Frequent to Continuous < 30	Pitch Black with the need for street lights and housing lights.	1. Severe damage to trees and property. Damage is widespread. 2. Flooding rains. 3. Damaging hail. 4. Damaging wind gusts to trees and buildings. 5.Tornados F3-F5 or family of tornados can occur and cause total devastation. 6. Widespread power outage

Previous Occurrences

There have been 137 events reported from January 2015 to January 2020. Reported damage for these events totals $525K.

Probability of Future Events

Based on previous occurrences, the planning area is likely to see 27 Thunderstorm events per year, so the probability of an event is 100% in any given year. The entire planning area is expected to experience a T-1 to a T-5 event any given year.

Impact and Vulnerability

All parts of the planning area are equally likely to experience severe thunderstorm, lighting, strong winds and hail storm events.

In all participating jurisdictions, structures and their contents are vulnerable to damage by thunderstorms winds. Strong winds can down trees onto power lines, damage mobile homes (and other light construction) that are not anchored, and rip off roofing. Winds can cause death and injuries by lifting unanchored objects. On average, 55 people are killed and hundreds are injured each year in the United States by Lighting. Lightning can strike communications equipment (e.g. radio or cell towers, antennae, satellite dishes, etc.) and hamper communication and emergency response. Lightning strikes can cause significant damage to buildings, critical facilities, and infrastructure, largely by igniting a fire (and even wildfires). Hailstorms will cause damage to all structures, mainly roof shingles which can lead to roof leaks and further damage to the structure interiors. All types of real estate and personal property are vulnerable to hail; such as cars, trailers, boats, and crops. Hailstorms can cause bodily injury if caught outside without protection.

In Pulaski County a total of 626 State owned structures valued at $854,340,146 and 198 Critical facilities valued at $848,605,823 vulnerable to this hazard. According to the 2018 Arkansas All-Hazards Mitigation Plan, HAZUS Data for Pulaski County indicates $18,618 in crop. Any structures not properly constructed or anchored could be damaged.

3.4.8 Tornado

A tornado is a rapidly rotating vortex or funnel of air extending ground ward from a cumulonimbus cloud. Most of the time, vortices remain suspended in the atmosphere (Golden and Snow, 1991). When the lower tip of the vortex touches earth, the tornado becomes a force of destruction. Approximately 1,000 tornadoes are spawned by severe thunderstorms each year.

Tornadoes are related to larger vortex formations and therefore often form in convective cells such as thunderstorms or in the right forward quadrant of a hurricane, far from the hurricane eye. The strength and number of tornadoes are not related to the strength of the hurricane that generates them. Often, the weakest of hurricanes produce the most tornadoes (Bryant, 1991). In addition to hurricanes, events such as earthquake induced fire and fires from atomic bombs or wildfires may produce tornadoes.

The path of a single tornado generally is less than 0.6 mi (1km). The path length of a single tornado can range from a few hundred meters to dozens of kilometers. A tornado typically moves at speeds between 30 and 125 mph (50 and 200 km/h) and can generate internal winds exceeding 300 mph (500km/h). However, the lifespan of a tornado rarely is longer than 30 minutes.

Location

Because there is no defined geographic hazard boundary, all people and property in Pulaski County and the entire planning area are exposed to the risk of damage from tornadoes. Based on the short 50-year dataset, no clear areas of high tornado occurrence happen at any particular county scale. Thus, although tornado risk appears to vary at a statewide scale, variable tornado risk at the county scale cannot be demonstrated. Thus, mapping variations in tornado risk at a local or county scale is not currently possible. For the purpose of this plan, all parts of this plan are considered equally likely to experience a tornado event. This is proven to be the case in tornadoes that have occurred in a wide variety of areas.

Extent

The Enhanced Fujita (EF) Scale was devised by a panel of meteorologists and engineers convened by the Wind Science and Engineering Research Center at Texas Tech University. The Weather Channel's severe weather expert Dr. Greg Forbes was on the team of experts who determined the revised wind speed ranges. Since 2007, the EF Scale has been used to rate tornadoes.

Enhanced Fujita Scale		
Category	Wind Speed	Potential Damage
EF0	105–137 km/h 65–85 mph	Light damage. Peels surface off roofs; some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; mobile homes pushed off foundations or overturned; sign boards damaged.
EF1	138–179 km/h 86–110 mph	Moderate damage. Roofs torn off frame houses; windows and glass doors broken; moving autos blown off roads; mobile homes demolished; boxcars overturned.
EF2	180–217 km/h 111–135 mph	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	218–266 km/h 136–165 mph	Severe damage. Some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	267–324 km/h 166–200 mph	Devastating damage. Well-constructed houses and whole frame houses completely leveled; structures with weak foundations blown away some distance; trees debarked; cars thrown and small missiles generated.
EF5	>324 km/h >200 mph	Incredible damage. Strong frame houses leveled off foundations and swept away; with strongest winds, brick houses completely wiped off foundations; automobile-sized missiles fly through the air in excess of 100 m (109 yd); cars thrown and large missiles generated; incredible phenomena will occur.

Associated hazards include:

- Wind- Tornadoes consist of strong, often destructive winds that can uproot trees and damage buildings and cars
- Rain/Hail-Tornadoes are associated with thunderstorms and may be preceded or followed by heavy rainfall or hail. Depending on the hydrological conditions, flash flooding may occur.
- Obstacles to Response- Damage or destruction of public facilities, including hospitals, can complicate emergency response efforts. Additionally, debris may block roadways, there may be extensive damage to electric and telephone lines, utility lines may be broken, and communication may be cut off because of damaged or destroyed cell, radio and television towers.

All participating jurisdictions could experience a tornado on the Enhanced Fujita Scale from an EF0 to EF5.

<u>The entire planning area could experience any of the below damages corresponding to the wind speed on the Enhanced Fujita Scale.</u>

RESIDENTAL HOME DAMAGE CLASSES		
Degree of Damage (DOD)		Expected Wind Speed Value (mph)
1	Threshold of visible damage	65
2	Loss of roof covering material (<20%), gutters, and/or Awning; loss of vinyl or metal siding	79
3	Broken glass in doors and windows	90
4	Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney, garage doors; collapse inward, failure of porch or carport.	97
5	Entire house shifts off foundation	121
6	Large sections of roof structure removed; most walls remain standing	122
7	Exterior walls collapsed	132
8	Most walls collapsed, except small interior rooms	152
9	All walls collapsed	170
10	Destruction of engineered and/or well-constructed residence; slab swept clean.	200

Source: FEMA

Previous occurrences

In Pulaski County there have been 8 reported tornadoes between 2015 and 2019.

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
WYE	PULASKI CO.	AR	03/13/2016	17:15	CST-6	Tornado	EF0	0	0	5.00K	0.00K
OLMSTEAD	PULASKI CO.	AR	03/24/2017	22:20	CST-6	Tornado	EF2	0	6	350.00K	0.00K
OLMSTEAD	PULASKI CO.	AR	03/24/2017	22:23	CST-6	Tornado	EF1	0	0	100.00K	0.00K
WAMPOO	PULASKI CO.	AR	03/09/2019	10:24	CST-6	Tornado	EF1	0	2	100.00K	10.00K
TERRYTOWN	PULASKI CO.	AR	05/02/2019	11:37	CST-6	Tornado	EF1	0	0	100.00K	30.00K
SYLVAN HILLS	PULASKI CO.	AR	05/02/2019	12:14	CST-6	Tornado	EF0	0	0	100.00K	20.00K
OLMSTEAD	PULASKI CO.	AR	05/02/2019	12:26	CST-6	Tornado	EF0	0	0	0.00K	2.00K
OLMSTEAD	PULASKI CO.	AR	05/02/2019	12:28	CST-6	Tornado	EF0	0	0	0.00K	5.00K
WARSAW	PULASKI CO.	AR	05/02/2019	12:33	CST-6	Tornado	EF0	0	0	30.00K	10.00K
Totals:								0	8	785.00K	77.00K

Probability of Future Events

Based on previous occurrences, the planning area is likely to see 1 tornado event per year ranging from an EF1 to an EF2. There is a 4.69% chance a tornado will occur in any given year in the planning area.

Impact and Vulnerability

Tornadoes can cause significant damage to trees, building, and power infrastructure. They can cause fatalities, particularly when people are unable to get to a protective shelter. All areas, residents, structures, and critical facilities in Pulaski County are of high risk of tornado events. Mobile Homes are of the highest risk.

Because there is no defined geographic hazard boundary, all people and property in Pulaski County are exposed to the risk of damage from tornadoes. All structures in Pulaski County are vulnerable to tornadoes. Data for Pulaski County indicates a total of the total building exposure for Pulaski County is $53,619,942 and Crop Exposure is $18,618,000. Those structures not properly constructed or anchored could be damaged or destroyed. The most vulnerable to tornadoes are wood frame structures and manufactured homes; 70% of dwellings in Pulaski County are standard frame homes, and 5.9% are mobile homes. This is a substantial portion of the housing stock that is highly vulnerable to damages from tornado events. Damage to residential structures could cause hundreds to be without shelter, or try to live in unsafe conditions.

Utilities most vulnerable to tornado winds are electrical power (e.g. power generation facility, above ground transmission lines and sub-stations) and communication structures (radio towers, cell phone towers). Most transportation systems such as highways, railways are not highly vulnerable to tornadoes, but downed power lines and trees and limbs can delay travel until roads are cleared. This would not only affect the day to day traffic but also critical services such as emergency police, fire, and ambulance.

Vulnerable populations including retirement homes, schools and child care centers are located in about every section in the county.

All of the planning area would be affected due to the lost power, water, sewer, gas, and communications. Power and water outages would cause food spoilage and sanitation problems for communities. Hospitals, grocery stores and other critical need and economically important facilities are damaged and closed for extended periods. The School Districts located in Pulaski County could be closed for extended periods due to these outages or possible damage to building structures on school campuses. The school buses are also vulnerable to damage or may face disruption due to unclear roadways and bridges. Employment would be affected from school closings.

Businesses and local government infrastructure often suffer extensive damage in tornadoes as well as the death of people, wildlife and livestock. Employment is often affected because of businesses that close due to the tornado damage and loss of business. Even with the advances in meteorology, tornado warning times may be issued in a short period of time.

3.4.9 Wildfire

A wildfire is any outdoor fire that is not controlled, supervised, or arranged that spreads through vegetative fuels, exposing and possibly consuming structures. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. There are essentially two types of fires. They are known as wildland fires and Wildland-Urban Interface (WUI) fires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. A WUI fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. Areas with a large amount of wooded, brush and grassy areas are at highest risk of wildfires. Additionally, areas anywhere that have experienced prolonged droughts or are excessively dry are also at risk of wildfires. WUI is further described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire.

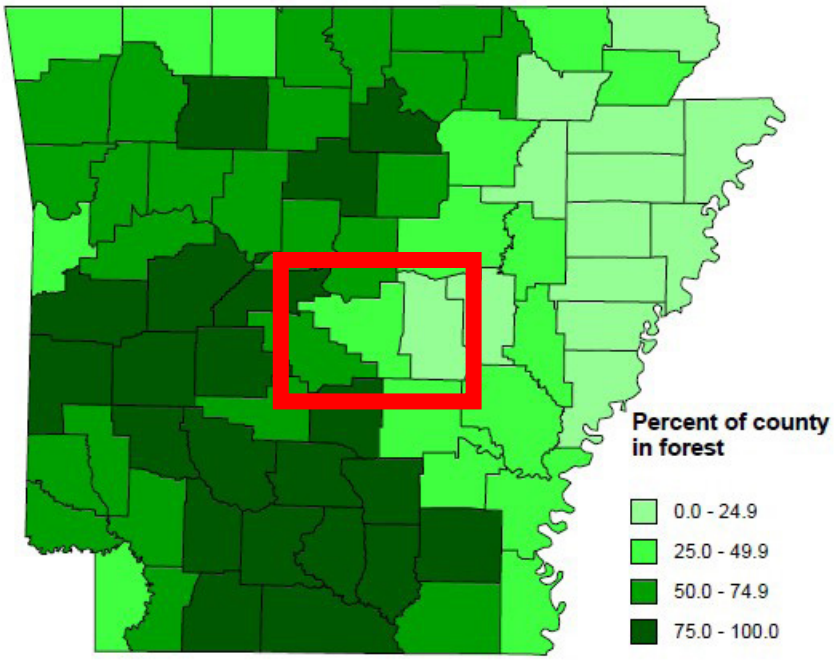
Location

The Wildland Urban Interface (WUI) Risk Index is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes.

Pulaski County and any jurisdiction located in zones that inhibit the primary factors of fuel, topography, and weather is susceptible to wildfire. These three factors can predict wildfire behavior in WUI areas and wildland areas. Large amount of wooded, brush, and grassy areas are considered fuel that promotes the

spread of wildfires. Topography affects the movement of air over the ground surface, and the slopes of terrain will change the rate of speed that the fire spreads. Lastly, areas that have experienced prolonged droughts or excessive dry spells can predict wildfires. For WUI fires, any location that intermixes with wildland fuel and human development along with topography and weather are at risk to wildfire. The entire county possesses some type of fuel, whether grass, agriculture, forestry, shrubs, structures, or other vegetation types. An estimated 50-74.9% of Pulaski County is forest.

Maps for each plan participant showing the location of areas at risk for wildfire are included in the next section.



Extent

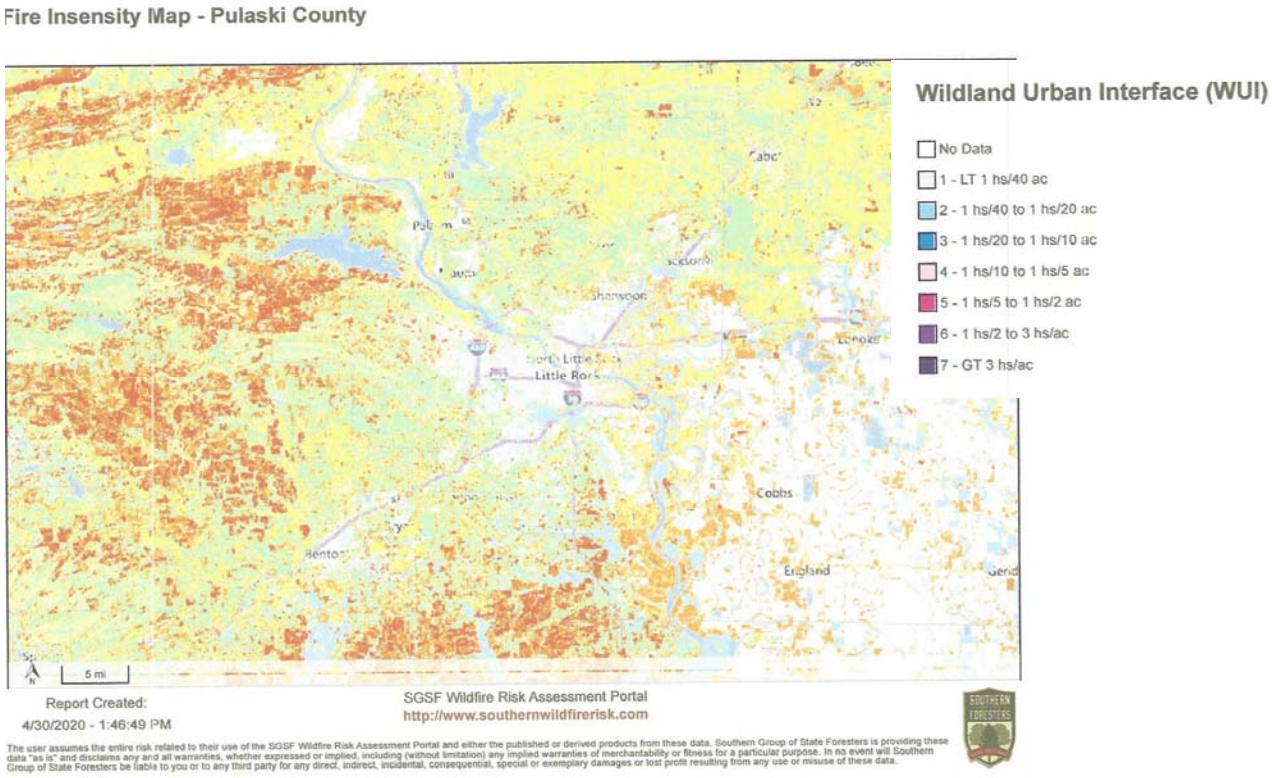
Based on Arkansas Forestry Commission data from 2013 through 2019, there were 141 fires and 1,850 acres burned in Pulaski County. The most acres burned in a year in the County were 401 acres in 2018; the #1 cause of the fires that year was "debris".

The Fire Intensity Scale (FIS) Scale, retrieved from the Southern Wildfire Risk Assessment, specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on weighted average of four percentile weather categories. Fire intensity scale is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently. To account for this variability, four percentile weather categories were created from historical weather observations to represent low, moderate, high, and extreme weather days for each weather influence zone in the planning area. A weather influence zone is an area where, for analysis purposes, the weather on any given day is considered uniform.

Similar to the Richter scale for earthquakes, FIS provides a standard scale to measure potential wildfire intensity. FIS consist of 5 classes where the order of magnitude between classes is ten-fold. The minimum class, Class 1, represents very low wildfire intensities and the maximum class, Class 5, represents very high wildfire intensities. Refer to descriptions below.

Fire Intensity Scale (FIS)		
Class 1	Very Low Fire Intensity	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 2	Low Fire Intensity	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 3	Moderate Fire Intensity	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential to cause harm or damage to life and property.
Class 4	High Fire Intensity	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
Class 5	Very High Fire Intensity	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

The Fire Intensity Scale for Pulaski County, the cities of Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood, Wrightsville (as well as, Jacksonville – North Pulaski School District, Little Rock School District, Pulaski County Special School District, North Little Rock School District, Arkansas School for the Blind, Arkansas School for the Deaf) shows the locations, impact and vulnerability of wildfire. As indicated on the below map, the planning area could see a Class 1-2.5 on the FIS.

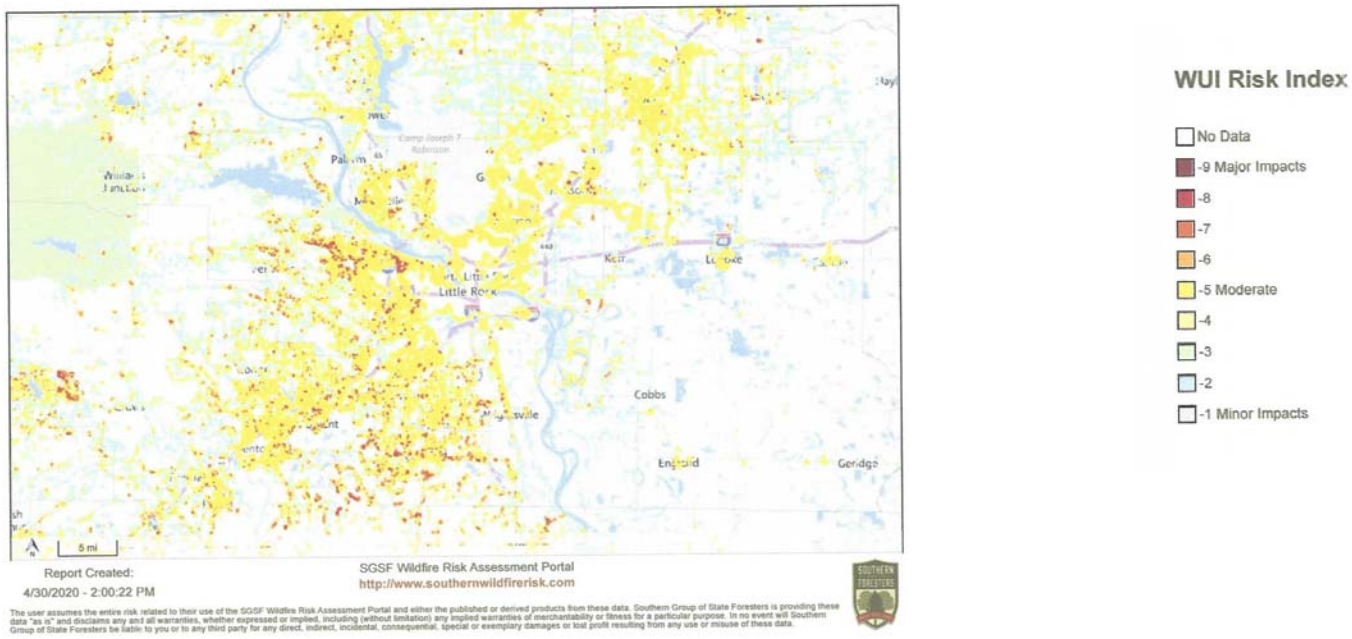


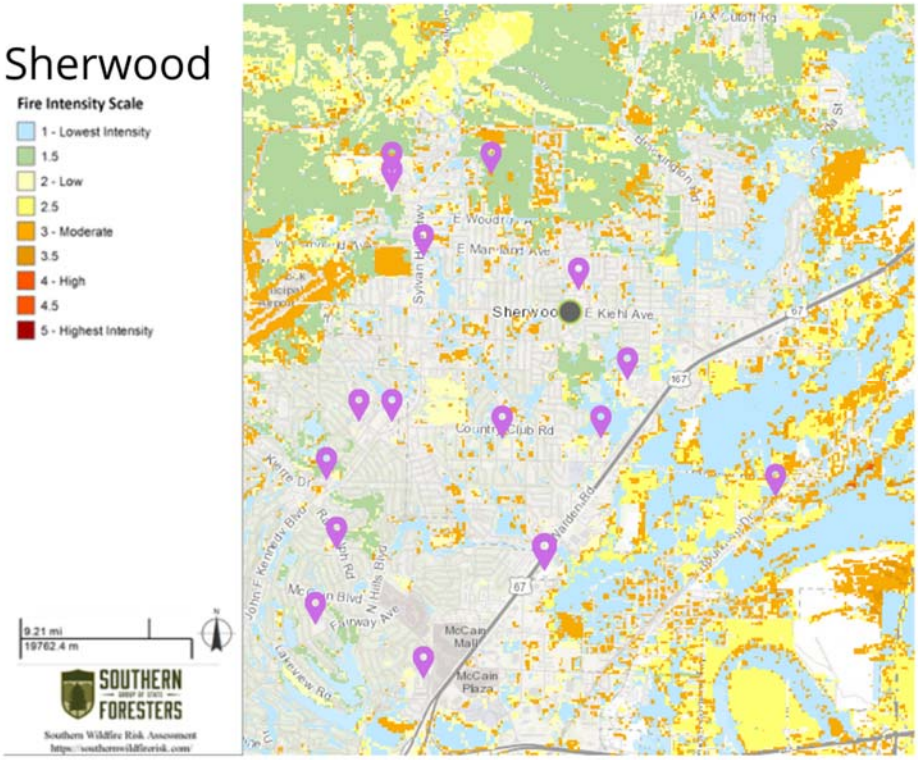
The WUI Risk Index is derived using a Response Function modeling approach. Response functions are a method of assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length. The WUI Risk Index range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1. To calculate the WUI Risk Index, the WUI housing density data was combined with Flame Length data and response functions were applied to represent potential impacts for all unique conditions of WUI housing density and flame length. The response functions were defined by a team of experts based on values defined by the SWRA Update technical team. By combining flame length with the WUI housing density data, you can determine where the greatest potential impact to homes and people is likely to occur.

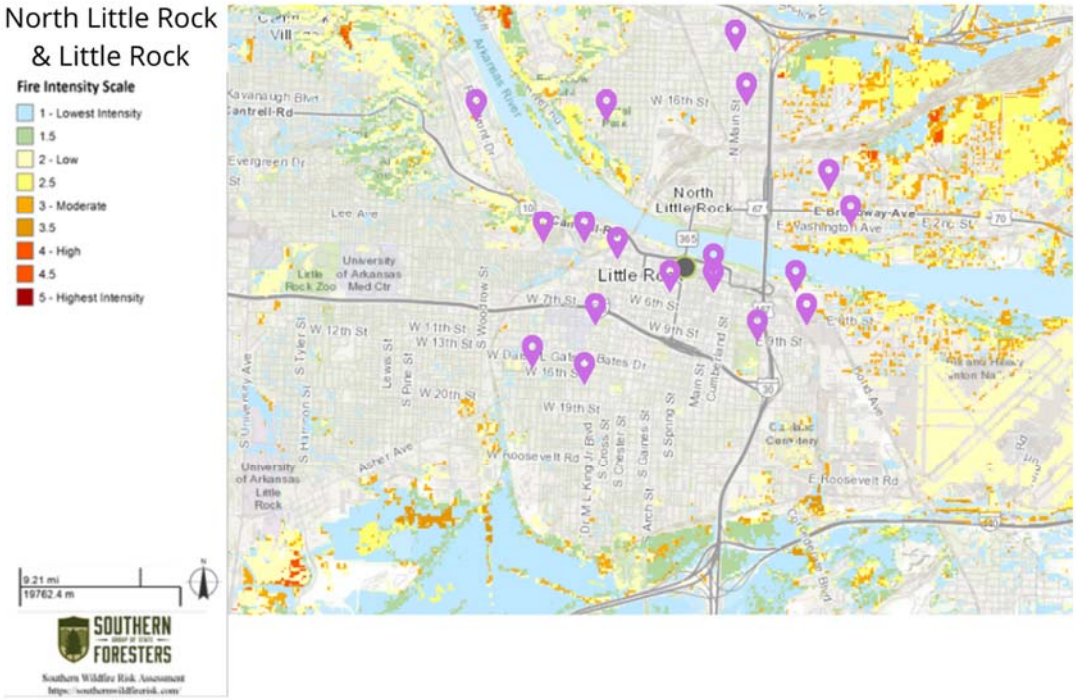
Flame Length is used as a measure of fire intensity. With the WUI Risk Index the analysis incorporates penetration into urban fringe areas so that outputs better reflect real world conditions for fire spread and impact in urban interface areas. With this enhancement, houses in urban areas adjacent to wildland fuels are incorporated into the WUI risk modeling.

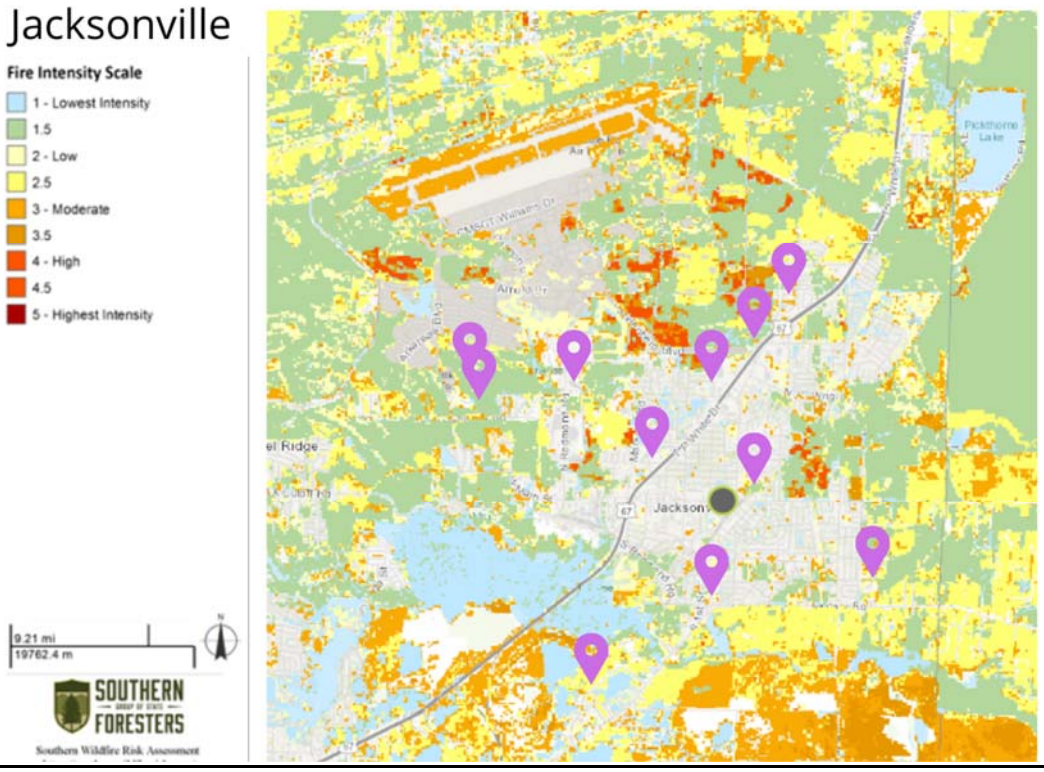
A summary of the WUI Risk Index for the entire planning area (Pulaski County as a whole) is provided in the table below. The majority of the planning area is at a 1-5 risk index level. Risk indexes for each participating jurisdiction are depicted in the following maps.

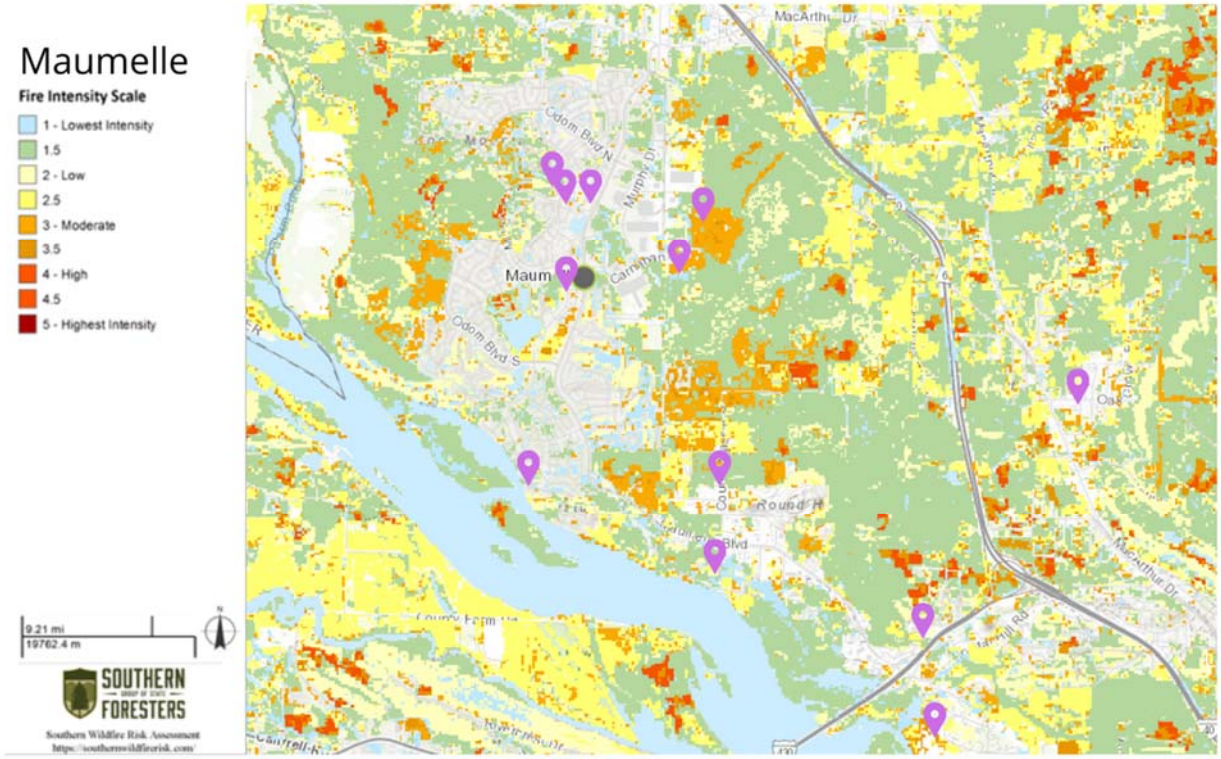
WUI Risk Index - Pulaski County

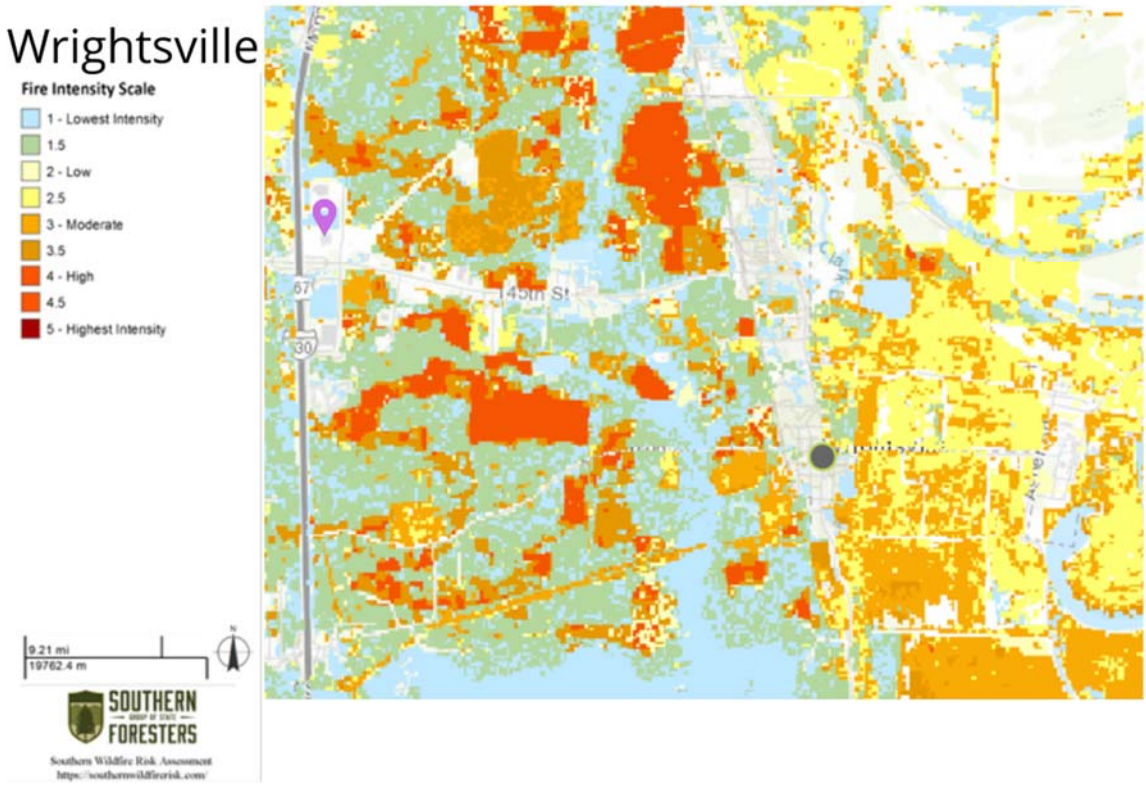



Sherwood
Fire Intensity Scale
1 - Lowest Intensity
1.5
2 - Low
2.5
3 - Moderate
3.5
4 - High
4.5
5 - Highest Intensity
9.21 mi
19762.4 m
SOUTHERN FORESTERS
Southern Wildfire Risk Assessment


North Little Rock & Little Rock
Fire Intensity Scale
1 - Lowest Intensity
1.5
2 - Low
2.5
3 - Moderate
3.5
4 - High
4.5
5 - Highest Intensity
9.21 mi
19762.4 m
SOUTHERN FORESTERS
Southern Wildfire Risk Assessment


Jacksonville
Fire Intensity Scale
1 - Lowest Intensity
1.5
2 - Low
2.5
3 - Moderate
3.5
4 - High
4.5
5 - Highest Intensity
9.21 mi
19762.4 m
SOUTHERN FORESTERS
Southern Wildfire Risk Assessment


Maumelle
Fire Intensity Scale
1 - Lowest Intensity
1.5
2 - Low
2.5
3 - Moderate
3.5
4 - High
4.5
5 - Highest Intensity
9.21 mi
19762.4 m
SOUTHERN FORESTERS
Southern Wildfire Risk Assessment



Previous Occurrences

There have been 103 wildfire events reported between 2015 and 2019 by the Arkansas Forestry Commission.

Wildfire Summary

Years	*Number of Fires*	*Total Acres Burned*	*5-Year Average # of Fires*	*5-Year Average # of Acres Burned*
2015	21	343		
2016	25	395		
2017	28	174		
2018	16	401		
2019	13	71		
TOTALS	103	1,384	21	271

Probability of Future Events

Based on previous occurrences, the planning area is likely to see 21 wildfire events per year of varying severities.

Impact and Vulnerability of Wildfire

According to the Arkansas State All-Hazards Mitigation Plan (2013) Pulaski County's population was 192,820 with 84,444 Housing Units with an estimated loss of $8,875,065 that could be affected by wildfire.

WUI- Population and Acres[1]

Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	1,556	9.5%	72,787	59.6%
1hs/40ac to 1hs/20ac	1,508	9.2%	20,565	16.8%
1hs/20ac to 1hs/10ac	1,945	11.9%	13,857	11.3%
1hs/10ac to 1hs/5ac	2,589	15.8%	8,132	6.7%
1hs/5ac to 1hs/2ac	2,583	15.8%	4,014	3.3%
1hs/2ac to 3hs/1ac	6,181	37.8%	2,816	2.3%
GT 3hs/1ac	0	0.0%	0	0.0%
Total	**16,362**	**100.0%**	**122,172**	**100.0%**

The majority of the planning area's population (382,748) is in a density area of 1 house /2 acres to 3 houses/1 acre, meaning the majority of the planning area's population is vulnerable to wildfire.

Fire Fighters are the most vulnerable populations during wildfires. Fire fighters can face mortality due to heat exhaustion. Other vulnerable populations are those that live in a High Intensity area (FIS), the population in the dense housing area referenced in the paragraph above, and those that reside in wood frame structures or manufactured homes, especially the elderly and children.

Location	Wood/Frame Structures	Manufactured Homes
Entire County	70%	5.9%

[1] Excerpts from the Southern Wildfire Risk Assessment Summary Report for Pulaski County: WUI housing density is categorized based on the standard Federal Register and U.S. Forest Service SILVIS data set categories, long considered a de facto standard for depicting WUI. However, in the SWRA WUI data the number of housing density categories is extended to provide a better gradation of housing distribution to meet specific requirements for fire protection planning activities. While units of the actual data set are in *houses per sq. km*., the data is presented as the *number of houses per acre* to aid with interpretation and use by fire planners in the South.

In the past, conventional wildland urban interface data sets, such as USFS SILVIS, have been used to reflect these concerns. However, USFS SILVIS and other existing data sources do not provide the level of detail for defining population living in the wildland as needed by Southern state WUI specialists and local fire protection agencies.

The new SWRA WUI 2012 dataset is derived using advanced modeling techniques based on the SWRA Where People Live (housing density) dataset and 2012 LandScan population count data available from the Department of Homeland Security, HSIP Freedom Data Set. WUI is simply a subset of the Where People Live dataset. The primary difference between the WPL and WUI is that populated areas surrounded by sufficient non-burnable areas (i.e. interior urban areas) are removed from the Where People Live data set, as these areas are not expected to be directly impacted by a wildfire. Simply put, the SWRA WUI is the SWRA WPL data with the urban core areas removed.

Data is modeled at a 30-meter cell resolution, which is consistent with other SWRA layers. The following table shows the total population for each WUI area within the project area.

3.4.10 Winter Storm

Severe winter storms, which may include heavy snowfall, ice storms, winter storms, and/or strong winds, affect every state in the continental United States. Areas where such weather is uncommon, such as Arkansas, are typically disrupted more severely by severe winter storms than are regions that experience this weather more frequently.

The National Weather Service (NWS) defines snow as a steady fall of **snow** for several hours or more. **Heavy snow** is defined as either a snowfall accumulating to 4 inches in depth in 12 hours or less, or snowfall accumulation to 6 inches or more in depth in 24 hours or less. In states such as Arkansas, where lesser accumulations can cause significant impacts, lower thresholds may be used. A **blizzard** means that the following conditions prevail for a period of three hours or longer: 1) sustained wind or frequent gusts to 35 miles an hour or greater; and 2) considerable falling and/or blowing snow (i.e., reducing visibility to less than 1/4 mile). **Sleet** is defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes. These pellets of ice usually bounce after hitting the ground or other hard surfaces. **Heavy sleet** is a relatively rare event defined as the accumulation of ice pellets covering the ground to a depth of 0.5 inch or more.

Freezing rain or **freezing drizzle** occurs when rain or drizzle freezes on surfaces such as the ground, trees, power lines, vehicles, streets, highways, etc. Small accumulations of ice can cause driving and walking difficulties while heavy accumulations produce extremely dangerous and damaging conditions. An **ice storm** is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of 0.25 inches or greater.

A combination of severe winter weather types occurring over a wide area is usually called a **winter storm**. Winter-storm formation requires below freezing temperatures, moisture, and lift to raise the moist air to form the clouds and cause precipitation. Lift is commonly provided by warm air colliding with cold air along a weather front. Various causes exist for winter storms in the United States. Winter storms in Midwestern and plains states typically develop over southeast Colorado on the lee side of the Rockies. These storms move east or northeast and use both the southward plunge of cold air from Canada and the northward flow of moisture from the Gulf of Mexico to produce ice, snow, and sometimes blizzard conditions. These fronts may push deep into the interior regions, sometimes as far south as Florida.

Location

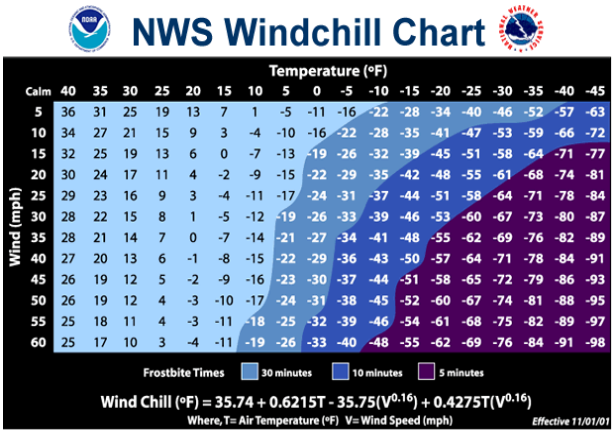
All areas of the planning area are equally susceptible to severe winter storm events.

Extent

According to National Climatic Data Center (NCDC) and National Weather Service Data, typical snow accumulations in Pulaski County during heavy snow and winter storm events ranges from 2 inches to 8 inches. Typical ice storm accumulations range from 1 inch to 1 ½ of inches. When severe winter storm

events do occur (the worse typically associated with ice), they are usually wide-spread over the area and impede the movement of vehicles – limiting regular movement of traffic, causing accidents and limiting responsiveness of emergency services – and can down power and communications lines and seriously damage some structures, thus creating potentially critical conditions for the entire area.

Students may be kept inside by the determination of the building principals if there are extreme cold temperatures. Wind chill would be the determining factor in keeping students inside. Some districts initiate monitoring for wind chill is below 32 degrees, some 40 degrees.



Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
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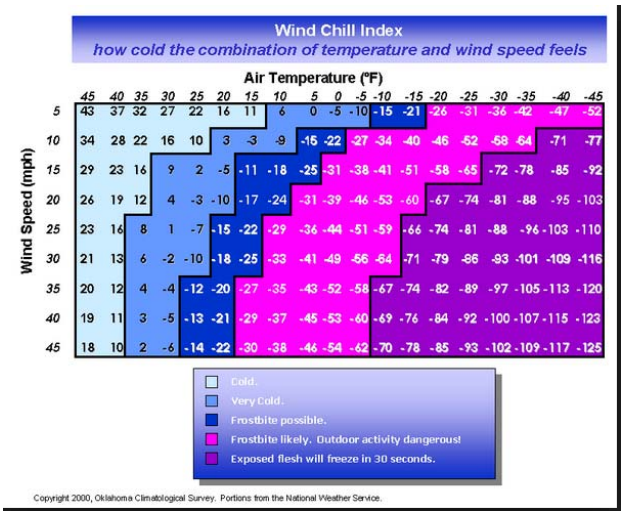
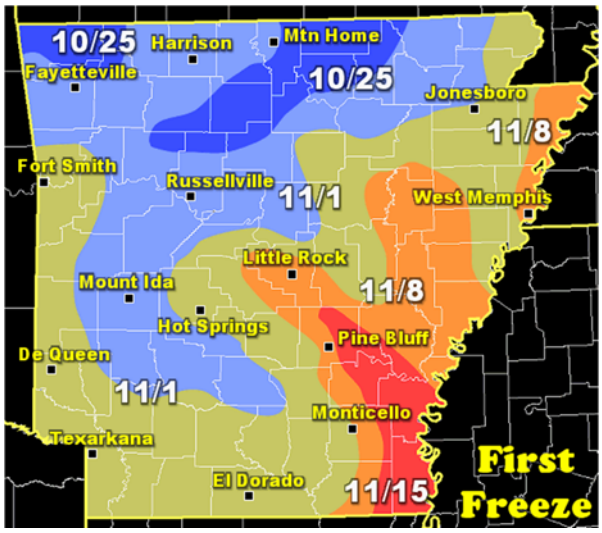
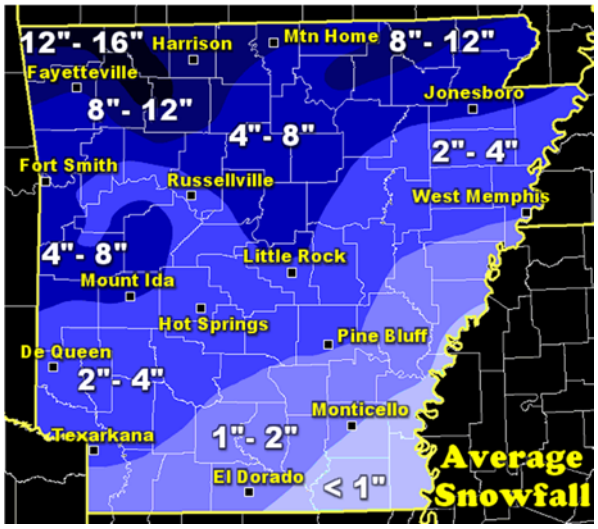


	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	43	37	32	27	22	16	11	6	0	-5	-10	-15	-21	-26	-31	-36	-42	-47	-52
10	34	28	22	16	10	3	-3	-9	-15	-22	-27	-34	-40	-46	-52	-58	-64	-71	-77
15	29	23	16	9	2	-5	-11	-18	-25	-31	-38	-41	-51	-58	-65	-72	-78	-85	-92
20	26	19	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60	-67	-74	-81	-88	-95	-103
25	23	16	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66	-74	-81	-88	-96	-103	-110
30	21	13	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71	-79	-86	-93	-101	-109	-116
35	20	12	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-74	-82	-89	-97	-105	-113	-120
40	19	11	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76	-84	-92	-100	-107	-115	-123
45	18	10	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78	-85	-93	-102	-109	-117	-125



First Freeze (Fall)

In the pictures: Average first freeze dates in the fall and last freeze dates in the spring across Arkansas.
In Arkansas, freezes typically occur by the last week in October across northern and western sections of the state (Ozark and Ouachita Mountains). Elsewhere, freezes tend to hold off until the first couple of weeks in November. In the spring, the last freeze usually happens by mid-March in the southeast. For the remainder of the region, freezes usually linger into April and sometimes into early May in parts of the north.



In the picture: Average annual snowfall across Arkansas

In Arkansas, most snow falls in the months of January, February, March, and December. Average annual accumulations range from less than an inch in the southeast to more than a foot in the northwest. Pulaski County's average annual snowfall is between 2'-4'.

Previous Occurrences

There have been 3 countywide winter storm events between 2015 and 2019; and 0 of these events were classified as ice storms.

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	160.00K	0.00K
PULASKI (ZONE)	PULASKI (ZONE)	AR	02/15/2015	23:00	CST-6	Winter Storm		0	0	100.00K	0.00K
PULASKI (ZONE)	PULASKI (ZONE)	AR	03/04/2015	17:00	CST-6	Winter Storm		0	0	60.00K	0.00K
PULASKI (ZONE)	PULASKI (ZONE)	AR	01/21/2016	23:00	CST-6	Winter Storm		0	0	0.00K	0.00K
Totals:								0	0	160.00K	0.00K

Probability of Future Events

Based on previous occurrences, the planning area is likely to see .6 chance of a winter storm events per year of varying severities.

Impact and Vulnerability

The occurrence of severe winter weather has a substantial impact on communities, utilities, transportation systems, and agriculture, and often results in loss of life due to accidents or hypothermia. Severe winter weather hazards include snowstorms, ice storms, storms with strong winds, and extreme cold. Heavy snow from a snowstorm can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. The cost of snow removal, repairing damages, and loss of business can have large economic impacts on cities and towns.

Heavy accumulations of ice or snow commonly result in collapse of structural damage to buildings. The damage may be caused directly by the excessive weight of the ice/snow accumulation, or by ice-laden trees or branches falling on structures. Homes, business, as well as weaker nonresidential structures

commonly sustain structural damage. Poultry houses in Arkansas are particularly at risk. Additional agricultural revenues are lost because of the time it takes to rebuild the poultry houses.

Heavy accumulations of ice from ice storms or heavy snow can also bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the damage. Power and communications disruptions are common consequences of ice storms and heavy snow. The monetary values of power and communications losses to businesses are significant but difficult to estimate.

Accumulations of ice and snow may also cause extreme hazards to motorists. Motorists in Pulaski County are generally unaccustomed to driving on slick roads resulting in an increase in traffic accidents, some of which may result in fatalities. Travel is hampered by ice or heavy snow because the state lacks sufficient snow removal equipment and road treatments (sand, salt) because of the infrequent occurrence of severe winter weather events. The cost of the numerous traffic accidents, as well as the cost of business and school closings that occur due to hazardous travel conditions, are difficult to estimate.

Winter storms are sometimes accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chill. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines.

The elderly are at increased risk for hypothermia because the skin thins with age. Accidents involving gas heaters and fires for warmth could also occur when not properly supervised, or ventilation is poor when used indoors.

SECTION 4: Mitigation Strategy

The Pulaski County Hazard Mitigation plan includes a mitigation strategy that provides the Pulaski County'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 by funding through county, city and school district taxes, yearly budgets and passing ordinances.

The following capabilities describe what the County, Cities and School Districts may or may not have to implement and maintain mitigation efforts, are addressed in the existing authorities, policies, programs and resources available to accomplish hazard mitigation.

The cities of Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood and Wrightsville each are different in terms of staffing, funding, policies and program giving them the ability to carry out their local hazard mitigation goals. Each city has the capability to be an active member in the NFIP, to pass mitigation ordinances for their local government, regulate and limit the development in flood prone and other hazard areas through land use planning implement retrofit construction plans, brace equipment, and provide emergency preparedness information to area residents through FEMA brochures.

All participating jurisdictions would be dependent upon grant funding to assist with larger mitigation projects, such as safe rooms and heavy duty generators to back up and maintain electrical power for critical facilities. The Cities would need assistance in financing drought communication and early warning systems, heating and cooling centers.

There are seven incorporated municipalities in Pulaski County in addition to Pulaski County government. Communities range in size. The Table below shows the diversity in their population.

Population	Community

Over 100,000	Pulaski County, Little Rock
Over 50,000	North Little Rock
Over 10,000	Jacksonville, Maumelle & Sherwood
Less than 3,000	Wrightsville & Cammack Village

Cammack Village and Wrightsville have populations less than 3,000, and therefore have less capacity and resources to reduce losses in the future when compared to Little Rock, North Little Rock Jacksonville, Maumelle, Sherwood and unincorporated Pulaski County. Each of the School Districts follows their respective jurisdiction's policies and programs. These education institutions also have varying resources to implement mitigation activities. It is likely grant funds may be needed to help all jurisdictions implement identified mitigation projects.

4.1 Mitigation Goals and Objectives for Each Hazard

Based upon the results of the local and State risk assessments, the Pulaski County Hazard Mitigation Planning Team, with input from local jurisdictions and officials, developed hazard mitigation goals and objectives and selected those that were determined to be of greatest benefit. These goals and objectives represent what Pulaski County believes is a long-term vision for reduction and enhancement of mitigation capabilities:

Goal 1. Reduce the potential for loss of life, injury and economic damage created by exposure to natural hazard for residents of Pulaski County due to natural disasters.

Objective 1.1	Identify, describe, and characterize the natural hazards to which Pulaski County is susceptible
Objective 1.2	Assess the risk of each hazard including probability and frequency, exposure, and consequences
Objective 1.3	Examine feasible mitigation opportunities appropriate for the identified hazards and prioritize those opportunities.
Objective 1.4	Implement mitigation actions to reduce loss of lives and property
Objective 1.5	Identify mitigation opportunities for long-range planning consideration
Objective 1.6	Encourage members of the Pulaski County Local Emergency Planning Committee (LEPC) and other stakeholders to include mitigation measures in emergency planning efforts
Objective 1.7	Promote NFIP compliance throughout the County

Goal 2- Provide a framework and coordination to encourage all levels of government and public and private organizations to undertake mitigation to minimize potential disasters and to employ mitigation in the recovery following disasters.

Objective 2.1	Hold regular LEPC meetings to discuss mitigation actions with city officials, county emergency office, and private sectors
Objective 2.2	Keep records of all natural hazards and analyze areas that are at risk to prevent future losses

Goal 3- Seek grants for mitigation projects through the State and Federal funding.

Objective 3.1	Update Hazard Mitigation plan every 5 years
Objective 3.2	Inquire grant information from Arkansas Department of Emergency Management, and Planning and Development District

Goal 4- Protect existing properties from natural disasters.

Object 4.1 Protect existing structures from natural hazards using cost-effective approaches

4.2 Implementation of Mitigation Actions

The mitigation actions are prioritized based upon their effect on the overall risk to life and property. Ease of implementation, community and agency support and ease of obtaining funding. The County and participating jurisdictions have used the STAPLEE method to prioritize mitigation actions. This method has the benefit that the Mitigation actions are considered in discrete categories of Social, Technical, Administrative, Political, Economic and Environmental. Prioritization can therefore be made taking each of these categories into account, so that nothing is overlooked when considering which actions may be best for each jurisdiction to consider.

Criteria used for prioritization and review of mitigation actions based on STAPLEE

Evaluation Category	Sources of Information
Social	Members of Local governments and the County Government were members of the Hazard Mitigation Planning Team and had input throughout the planning process. It must be noted that many small town political leaders are also business or professional persons. They are also members of the LEPC. Existing community plans were and will be relied on wherever possible. Members of the media were contacted and invited to all attend all HMPT meetings.
Technical	The following persons/agencies were consulted as to the technical feasibility of the various projects: Arkansas Geological Commission, University of Arkansas Extension Service, Arkansas Soil and Water Conservation Commission, Arkansas Health Department, Arkansas Highway and Transportation Department, Arkansas Department of Environmental Quality, Arkansas Governor's Pre-Disaster Advisory Council, Arkansas Governor's Earthquake Advisory Council, Arkansas Forestry Service, Arkansas Natural Resources Commission and. Arkansas Department of Emergency Management. All of these had their comments and suggestions incorporated.
Administrative	Staffing for proper implementation of the plan currently will rely largely on existing members of the various agencies involved. Technical assistance is available from various local and state agencies. Some local jurisdictions have incorporated Hazard Mitigation efforts into their Capital Improvement Plans. Operations costs are under discussion by the appropriate agency or department heads.
Political	The County Quorum Court has passed resolutions in support of mitigation activities involving floodplain ordinances, mitigation planning, and fire districts, among others. The Governor of Arkansas issued an Executive Order in August of 2004 (EO 04-02) instructing all state agencies to assist ADEM in mitigation planning and implementation of mitigation goals.
Legal	Members of the HMPT discussed legal issues, and it was their opinion that no significant legal issues were involved in the projects that were selected by the HMPT. However, where legalities may be an issue, this is noted.
Economic	Economic and benefit cost issues were the predominant topics discussed by all concerned. Each entity felt that the projects selected would have positive effects, but yet realized that actions often have costs, sometimes hidden, imposed on the community, residents and businesses. Funding for the various activities was a major concern as local budgets are always under pressures with existing and competing projects and activities. Where necessary, particularly for costly capital projects, outside grants would be relied on heavily.
Environmental	The Arkansas Geological Survey, Arkansas Department of Environmental Quality, Arkansas Forestry Commission, and Arkansas Soil and Water Conservation Commission were all consulted as to the environmental impact of the various projects and it was felt that there would be no negative impact. Local environmental issues and concerns were also taken into consideration.

The Pulaski County Office of Emergency Management (ACOEM) will be responsible for evaluating actions among competing actions. The HMPT prioritized the list of mitigation actions by conducting a cost-benefit review. This review was conducted by; first considering the number of people who would be affected by a chosen project, determining the area the project would cover, considering how critical the structures were within in the project area, and which structure were most critical, and finally how would it benefit the entire community. The PCOEM shall evaluate actions based on funding availability, comparative value to mitigation objectives, and consideration of economic benefits and environmental concerns of the communities. Actions are prioritized in three different categories; **High** *need for immediate action*, **Medium** *need for action,* **Low** *lacking in urgency.*

All Pulaski County actions are the responsibility of the director of Pulaski County Office of Emergency Management, the County Judge and the Pulaski County Quorum Court. The Cammack Village, Jacksonville, Little Rock, Maumelle, North Little Rock, Sherwood and Wrightsville actions are the responsibility of their Mayors and City Councils. The School Districts of Jacksonville-North Pulaski, Little Rock, Pulaski County Special, North Little Rock, Arkansas

School for the Blind and Arkansas School for the Deaf will be the responsibility of their Board Administration and Superintendents.

The Responsible Agency for each mitigation action will identify resources. Their responsibility will be to examine resources from all levels of government. The responsible parties will integrate the requirements of the mitigation plan into other plans when appropriate. This also, includes funding and support for enacting and enforcing building codes and zoning ordinances, and developing public education programs to alert residents to risks and how they can reduce hazard losses. Plans will be made to earmark resources for implementing these actions. Each jurisdiction and school district within the County that participated in the planning process has at least two actions that will benefit the jurisdiction.

For the purpose of developing the Pulaski County Hazard Mitigation Plan, mitigation actions are categorized into five types;

- Local plans and regulations
- Structure and infrastructure projects
- Natural systems protection
- Education and awareness programs
- Other (may lend more toward preparedness, recovery or response capabilities)

All of the following Mitigation Actions meets all criteria for STAPLEE.

4.3 Previous Mitigation Actions

Below is a summary of progress of the mitigation actions determined in the 2014 Pulaski County Mitigation Plan. Those not completed were deferred due to lack of resources. The "Update Status" is as follows:

- **C**=Completed
- **PC**= Partially Complete; some action is still a need, and was partially deferred due to lack of resources
- **NLR**= No Longer Relevant
- **Deferred**