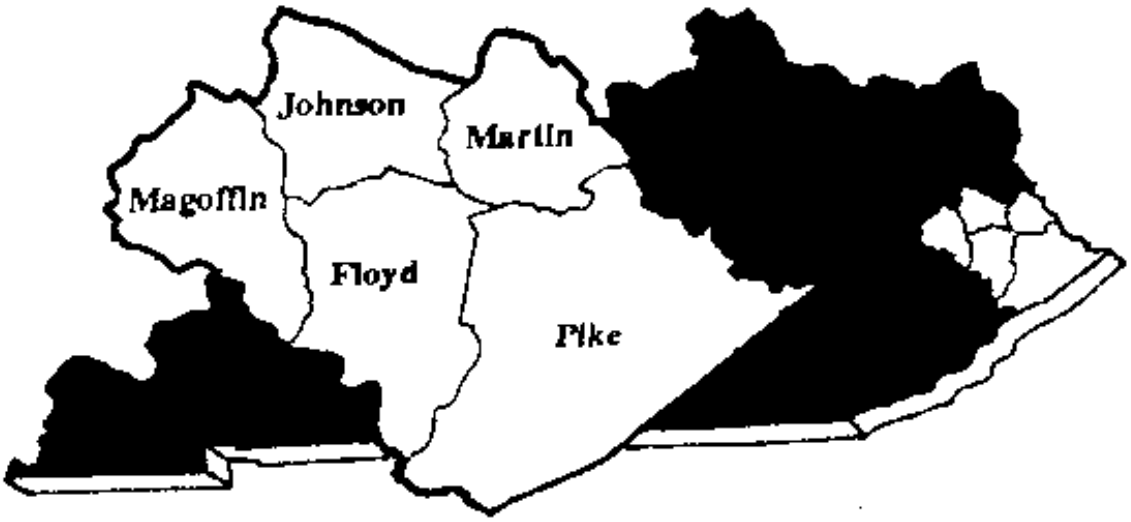
BIG SANDY ADD

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN



Big Sandy Area Development District
110 Resource Court
Prestonsburg, KY 41653
606-886-2374

TABLE OF CONTENTS

BIG SANDY AREA DEVELOPMENT DISTRICT MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

CHAPTER 1: INTRODUCTION

1.1 PURPOSE OF THE MITIGATION PLAN

BSADD's Multi-jurisdictional Mitigation Plan was prepared with the help of local officials, area emergency managers and BSADD's Area Development District staff. The Plan is designed to be used as a guide by each of the five counties and twelve cities within the BSADD service area in pre-disaster and post-disaster hazard mitigation situations. Mitigation is the process of reducing the severity of the impact of natural hazards through planning. An example of a mitigation project would be preparing a study on tornados for the BSADD service area; the public could be educated about building codes that alleviate tornado damage and encouraging its citizens to build in accordance with those codes. In other hazards, two or more types of mitigation can be used. For example in flooding hazards, cleaning streams/rivers of debris, and building a dry dam to slow down rapidly moving streams after flash flooding has occurred could be used in flood control along with the use of rain gauges to detect rising precipitation levels and sirens to alert the citizens along the stream. The enforcement of floodplain ordinances could also lower overall cost of disaster by keeping new structures out of identified flood prone areas. This plan can be used by individuals, organizations, local governments and private industry to coordinate their efforts in the mitigation process by providing sound planning and development strategies in the future.

1.2 AREA ORGANIZATIONS AND GOVERNANCE

The Big Sandy Area Development District is a multi-county, sub-state region authorized and organized pursuant to Statutes of the Commonwealth of Kentucky (KRS 147A). The Big Sandy Area Development District is charged with planning, promoting, and coordinating programs for regional economic and social development. The designated member jurisdictions of the District comprise the eastern most region of Kentucky including Floyd, Johnson, Magoffin, Martin, and Pike Counties and incorporated cities of Allen, Prestonsburg, Martin, Wheelwright, Wayland, Paintsville, Salyersville, Inez, Warfield, Elkhorn City, Pikeville, and Coal Run. The organizational structure of the District represents and responds to the elected and appointed officials of member counties, cities, special agencies of these governments, and the citizenry at large. This collaborative style of leadership including the public and private sector fields is deemed critical to the development of the Region.

The District encompasses 1,983 square miles with a total population of 151,154 persons according to 2013 Census. Four of the five counties of the region are recognized as economically distressed counties according to the Appalachian Regional Commission indicators such as high percentages in average unemployment rates and poverty rates, and less than average percentages in per capita market income. This culturally colorful region in the mineral rich central Appalachian Mountains supports a wide array of wildlife in undisturbed forests, and at once is the center of the eastern coalfields. The Tug Fork of the Big Sandy River bounds the region and the state on the northeast of Martin County with neighboring West Virginia. The Levis Fork of the Big Sandy stretches from the Virginia state line, traversing Pike, Floyd and Johnson counties on its way north. In the region's west are the headwaters of the Licking River. A significant portion of the Licking's main stem meanders the wide valleys of Magoffin County on its way to the Ohio River.

The District is comprised of 5 counties and 12 incorporated cities.

Floyd County, the second most populous county in the region, covers a land area of 394 square miles and had a population of approximately 38,728 projected for 2013. The population is expected to grow little, if any, by 2020. The median age is 39 based on 2013 US Census projection. The incorporated cities located in Floyd County include Allen, Martin, Prestonsburg, Wayland, and Wheelwright.

Pike County, located at the easternmost tip of Kentucky in the Eastern Kentucky Coal Field Region, covers 787 square miles of land area. It is both Kentucky's largest county (and the largest in landmass east of the Mississippi) and the nation's largest underground bituminous coal-producing county. The population of Pike County is 63,380 based on 2013 projections. The average age is 39.4 based on 2013 US Census projections. The incorporated cities in Pike County include Coal Run, Elkhorn City, and Pikeville.

Johnson County, the northernmost county in the District, has a population of 23,449 projected for 2013, and is projected to grow little if any by the year 2020. The average age is 38 based on 2013 US Census projection. Paintsville is the only incorporated city located in Johnson County.

Magoffin County, located in the western portion of the Big Sandy Region, has a population of 12,950 projected for 2013 – estimated to grow little if any by the year 2020. The average age is 34.3 based on 2013 US Census projections. Magoffin County has one incorporated city, Salyersville.

Martin County has a current estimated population of 12,647 projected for 2013; the county's population is projected to drop by the year 2020. The average age is 34.1 based on 2013 US Census projections. Inez and Warfield are the two incorporated cities located in Martin County.

Location	Jurisdiction	Population	Government Type	Term Limits
FLOYD	County	38,728	Judge Exec/4 Magistrates	4 year terms for both
Allen	City	190	Mayor/4 Commissioners	4 year Mayor/2 for Commissioners
Martin	City	622	Mayor/6 Council Members	4 year Mayor/2 for Commissioners
*Prestonsburg	City	3,222	Mayor/8 Council Members	4 year Mayor/2 for Commissioners
Wayland	City	421	Mayor//4 Commissioners	4 year Mayor/2 for Commissioners
Wheelwright	City	773	Mayor/4 Commissioners	4 year Mayor/2 for Commissioners
JOHNSON	County	23,449	Judge Exec/3 Commissioners	4 year terms for both
*Paintsville	City	4,119	Mayor/6 Commissioners	4 year Mayor/2 for Commissioners
MAGOFFIN	County	12,950	Judge Exec/3 Magistrates	4 year terms for both
*Salyersville	City	1,842	Mayor/6 Council Members	4 year Mayor/2 for Commissioners
MARTIN	County	12,647	Judge Exec/5 Magistrates	4 year terms for both
*Inez	City	705	Mayor/4 Council Members	4 year Mayor/2 for Commissioners
Warfield	City	264	Mayor/4 Commissioners	4 year Mayor/2 for Commissioners
PIKE	County	63,380	Judge Exec/6 Magistrates	4 year terms for both
Coal Run	City	1,500	Mayor/4 Commissioners	4 year Mayor/2 for Commissioners
Elkhorn City	City	1,002	Mayor/6 Council Members	4 year Mayor/2 for Commissioners
*Pikeville	City	6,413	Mayor/4 Commissioners	4 year Mayor/2 for Commissioners

Indicates county seat

1.3 BIG SANDY AREA DEVELOPMENT DISTRICT STAFF

The Big Sandy ADD staff is comprised of highly trained professionals who are actively involved in comprehensive local, regional, state, and federal strategic planning processes. These trained professionals work to bring forth an array services to the region including but not limited to aging, welfare to work, community and economic development, housing, transportation, mapping, accounting, technical, and human services. By sharing the professional expertise found at the Area Development District level, local governments are able to utilize available resources to provide each of their jurisdictions with services that normally would not be possible based on existing financial limitations presently available.

1.4 BSADD Multi-Jurisdictional Mitigation Planning Effort

The Big Sandy Regional Mitigation Planning process is a result of the Kentucky Emergency Management Agency (KYEM) and the Big Sandy Area Development District working together in order to produce a Regional Mitigation Plan for the Big Sandy Region. The Big Sandy Area Development District received a grant from FEMA to develop and update the Regional Hazard Mitigation Plan. The Disaster Mitigation Act of 2000 (DMA 2000) requires that communities must participate in the process and adopt their portion of the plan in order to be eligible for disaster-related funds. This act also requires local governments to develop and submit pre-disaster mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) project funding. FEMA and the state of KY have asked the Area Development Districts to coordinate the planning process for each member jurisdiction.

The most innovative portion of this plan is that the plan is a regional plan serving 5 counties and 12 cities in Eastern Kentucky. Through Regional Preparedness efforts placed in motion by the collaboration of local elected officials, community organizations and necessary public and private agencies, the Region better positions themselves to minimize

damage and loss associated with natural disasters that could potentially impact the Big Sandy Region. This project involved two major focuses, the process of planning and the establishment of a document that serves as a regional strategy for Hazard Mitigation.

The Big Sandy Regional Hazard Mitigation Plan has been developed as a Regional Strategy that further expands upon the State Strategy for Hazard Mitigation. The Development of the plan followed guidelines and regulations set forth by Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, enacted under the Disaster Mitigation Act of 2000.

The plan is broken down into the following sections:

1.1 Introduction
2.1 Prerequisites – Adoption by Governing Bodies
3.1 A Description of the Planning Process
4.1 Risk Assessment
5.1 Mitigation Strategies
6.1 Plan Maintenance Procedure

CHAPTER 2: PREREQUISITES

2.1 ADOPTION BY THE LOCAL GOVERNING BODIES

After final review of the plan by Kentucky Emergency Management and FEMA, the BSADD Regional Mitigation Committee notified BSADD the regional plan had been reviewed and approved by the committee. BSADD then notified each jurisdiction that it must adopt or not adopt this official hazard mitigation plan of the Big Sandy Area Development District for the region. By adopting the plan, that jurisdiction agreed with the findings and agreed to implement mitigation projects when funds became available. Jurisdictions that didn't adopt the plan were told that they wouldn't receive mitigation funding during disaster events in the future.

2.2 MULTI-JURISDICTIONAL PLAN ADOPTION

The following chart summarizes the decision of each jurisdiction to formally adopt/not adopt this plan as the jurisdiction's official hazard mitigation plan.

BSADD Multi-Jurisdictional Plan Adoption by County and City

Location	Jurisdiction	Adoption	Date Adopted
FLOYD	**COUNTY**	Yes	
Prestonsburg	City	Yes	
Allen	City	Yes	
Martin	City	Yes	
Wayland	City	Yes	
Wheelwright	City	Yes	
JOHNSON	**COUNTY**	Yes	
Paintsville	City	Yes	
MAGOFFIN	**COUNTY**	Yes	
Salyersville	City	Yes	
MARTIN	**COUNTY**	Yes	
Inez	City	Yes	
Warfield	City	Yes	
PIKE	**COUNTY**	Yes	
Coal Run	City	Yes	
Elkhorn City	City	Yes	
Pikeville	City	Yes	

2.3 MULTI-JURISDICTIONAL PLAN ADOPTION BY THE BSADD BOARD OF DIRECTORS

The 17 jurisdictions in the BSADD area [1]signed resolutions adopting the plan. Big Sandy Area Development District's board of directors will adopt a resolution at the September 27, 2016 board meeting.

[1] Copies available upon request

2.4 MULTI-JURISDICTIONAL PLANNING PARTICIPATION

The following chart shows the involvement in the planning process and writing of the plan with public participation included. The public's involvement was achieved through attendance by efforts of media campaigns/advertising inviting the public to every local and regional committee meetings. *Every jurisdiction* in the BSADD region participated in the local mitigation committee in each county.

Jurisdiction	Local/Regional Committee Meetings Attendance	Direct Planning Process	Direct Risk Assessment	Direct Plan Maintenance & Procedures	Presentation of Findings & Review	Adoption of Plan
FLOYD COUNTY	✓	✓	✓	✓	✓	✓
Allen	✓	✓	✓	✓	✓	✓
Martin	✓	✓	✓	✓	✓	✓
Prestonsburg	✓	✓	✓	✓	✓	✓
Wayland	✓	✓	✓	✓	✓	✓
Wheelwright	✓	✓	✓	✓	✓	✓
MAGOFFIN COUNTY	✓	✓	✓	✓	✓	✓
Salyersville	✓	✓	✓	✓	✓	✓
JOHNSON COUNTY	✓	✓	✓	✓	✓	✓
Paintsville	✓	✓	✓	✓	✓	✓
MARTIN COUNTY	✓	✓	✓	✓	✓	✓
Inez	✓	✓	✓	✓	✓	✓
PIKE COUNTY	✓	✓	✓	✓	✓	✓
Coal Run	✓	✓	✓	✓	✓	✓
Elkhorn City	✓	✓	✓	✓	✓	✓
Pikeville	✓	✓	✓	✓	✓	✓

Initial participants in the planning process represented each jurisdiction. Some mitigation members also served as (1) BSADD Board of Directors, (2) County/Regional Mitigation Committee Members. Residents served mainly at the county level and all members of the county mitigation committees were invited to participate at the regional level.

(1) The composite of the BSADD Board of Directors is as follows: Every Judge Executive from each of the five counties, mayors from 9 of the cities and five (5) citizen members from each of the five counties finish the board.

BSADD has the authority to make decisions, establish partnerships, and define goals and objectives for the BSADD region in community development/planning. All meetings are open to the public except for executive sessions

The chart of the following pages lists the BSADD Board of Directors, their Jurisdiction, and contact information, position on the board.

BIG SANDY AREA DEVELOPMENT DISTRICT BOARD OF DIRECTORS

Name/County	Phone	Board Position
FLOYD COUNTY		
Ben Hale	606-886-9193	Floyd County Judge Executive
Brian Morris	606-886-9193	Floyd County Judge Appointee
Burl Wells Spurlock	606-886-2321	Floyd County Citizen Member
Les Stapleton	606-886-2335	Mayor Prestonsburg
Sam Howell	606-285-9791	Mayor of the City of Martin
JOHNSON COUNTY		
Roger "Tucker" Daniel	606-789-2550	Johnson County Judge Executive
Lillian Wheeler	606-789-2550	Johnson County Judge Appointee
Mark McKenzie	606-789-	Johnson County Citizen Member
Bob Porter	606-789-2600	Mayor of the City of Paintsville
MAGOFFIN COUNTY		
Charles Hardin	606-349-2313	Magoffin County Judge Executive
Don Cecil	606-349-2233	Magoffin County Judge Appointee
Millow McCarty	606-349-6837	Magoffin County Citizen Member
Pete Shepherd	606-349-2409	Mayor of the City of Salyersville
MARTIN COUNTY		
[2]Kelly Callaham	606-298-2800	Martin County Judge Executive
Mike Crum	606-298-3746	Martin County Judge Appointee
Nita Collier	606-298-4073	Martin County Citizen Member
Terry Fraley	606-298-4602	Mayor of the City of Inez
Ronald Workman	606-395-6423	Mayor of the City of Warfield
PIKE COUNTY		
Bill Deskins	606-432-6247	Pike County Judge Executive
Roger Webb	606-432-6394	Pike County Judge Appointee
Kitty White-Baird	606-432-5504	Pike County Citizen Member
Jimmy Carter	606-437-5100	Mayor of the City of Pikeville
Andrew J. Scott	6064376032	Mayor of the City of Coal Run Village
Mike Taylor	606-754-5080	Mayor of the Elkhorn City
Susan Howard	606-789-6251	Services Regional Administrator

One of the major goals during this planning process was to fully engage all community players during Hazard Mitigation planning process. These community players include but not limited to the following: local officials, local community leaders, Big Sandy ADD Board members, various groups, organizations and committee members, state and local emergency management, public utilities, public services, and others who have major interests in making the region better prepared. The regional collaboration of community players during this planning process will help to reduce the social and economic costs associated with emergencies resulting from natural disasters. In order to fully establish a regional planning process the Big Sandy Area Development District staff made every effort to ensure proper notification was given throughout the process for any meetings.

In order to concentrate on the individual components of the planning process outlined in the Disaster Mitigation Act of 2000, the Regional Mitigation Committee broke the project down into step and established timelines we desired to accomplish those steps. Four steps were then created: Data Collection, Risk Assessment, Mitigation Strategy, and Implementation/Maintenance. The steps allowed for focus on each aspect in order to keep the process organized and on time. This network of communication engaged other community partners and general public in the Hazard Mitigation planning process. During all stages in the planning process the BSADD staff attempted to involve the public by having open meetings as well as public informational hearings. Public involvement was encouraged and every logical attempt was utilized in an effort to encourage the public to voice their opinions. Meeting Documentation notes, minutes, maps, attendance records, and information reviewed has been documented for all meetings and has been filed at the Big Sandy Area Development District office.

[2] Current Chairman of the Board. Board Chairmen serve single year terms but can serve up to two consecutive terms.

HAZARD MITIGATION LOCAL CONTACT LIST BY COUNTY/CITY

FLOYD COUNTY	Phone	Position
Ben Hale	606-886-9193	Judge Executive
Bobbie Johnson	606-886-9678	Emergency Manager
John Hunt	606-886-6171	Sheriff
Connie Hancock	606-886-9622	PVA
Lon May	606-886-0498	Floodplain Coordinator
Bobby Carpenter	606-886-1010	Building Inspector
City of Allen	**Phone**	**Position**
Sharon Woods	606-874-2534	Mayor
Linda Gibson	606-874-2953	City Clerk
Clyde Woods	606-886-6711	Police Chief
Randal Mulkey	606-874-8191	Fire Chief
Ernastine Hall	606-874-2953	Floodplain Coordinator
City of Martin	**Phone**	**Position**
Sam Howell	606-285-9335	Mayor
Ethel Clouse	606-285-9791	City Clerk
Austin Keene	606-285-3062	Police Chief
William Petree	606-886-6749	Fire Chief
Ethel Clouse	606-285-9791	Floodplain Coordinator
City of Prestonsburg	**Phone**	**Position**
Les Stapleton	606-886-2335	Mayor
Sharon Schoolcraft	606-886-2335	City Clerk
John Hunt	606-886-1010	Emergency Manager
Larry Woods	606-886-1010	Police Chief
Michael Brown	606-886-1010	Fire Chief
Miranda Hicks	606-886-1010	Floodplain Coordinator
City of Wayland	**Phone**	**Position**
Jerry Fultz	606-358-4037	Mayor
Sharon Anderson	606-358-4169	City Clerk
Brian Ratliff	606-358-4980	Police Chief
Mae Stumbo	606-358-4980	Fire Chief
Curt Lee	606-358-4411	Floodplain Coordinator
City of Wheelwright	**Phone**	**Position**
Don Hall	606-452-4037	Mayor
Beverly Taylor	606-452-4202	City Clerk
Randy Johnson	606-452-4818	Police Chief
Daniel Gullet	606-452-4100	Fire Chief
	606-452-4202	Floodplain Coordinator
MARTIN COUNTY	**Phone**	**Position**
Kelly Callaham	606-298-2800	Judge Executive
Lee Gauze	606-298-2088	Emergency Manager
John Kirk	606-298-2828	Sheriff
Bobby Hale	606-298-2807	PVA
Chris Todd	606-298-2089	Floodplain Coordinator
City of Inez	**Phone**	**Position**
Terry Fraley	606-298-0707	Mayor
Candy Crum	606-298-4602	City Clerk
Adam Crum	606-298-4602	Police Chief
Lee Gauze	606-298-2088	Fire Chief
Terry Fraley	606-298-2088	Floodplain Coordinator
City of Warfield	**Phone**	**Position**
Ronald Workman	606-395-6423	Mayor
Rhonda Price	606-395-6423	City Clerk
Jay Hinkle	606-939-4405	Assistant Fire Chief
Greg Alley	606-622-5570	Fire Chief
John Hensley	606-395-6423	Floodplain Coordinator

PIKE COUNTY	Phone	Position
Bill Deskins	606-432-6247	Judge Executive
Doug Tackett	606-432-0210	Emergency Manager
Rodney Scott	606-432-6260	Sheriff
Lonnie Osborne	606-432-6201	PVA
Jimmy Kiser	606-432-6204	Floodplain Coordinator
City of Coal Run	**Phone**	**Position**
Andrew H. Scott	606-437-6032	Mayor
Debra Tackett	606-437-6032	City Clerk
Jason Ray	606-437-0902	Police Chief
Levi Coleman	606-432-5801	Fire Chief
Debra Tackett	606-437-6032	Floodplain Coordinator
Elkhorn City	**Phone**	**Position**
Mike Taylor	606-754-5080	Mayor
Hope Ramey	606-754-5080	City Clerk
Joey Rose	606-794-5883	Police Chief
John Moore	606-754-8041	Fire Chief
Vacant	606-754-5080	Floodplain Coordinator
City of Pikeville	**Phone**	**Position**
Jimmy Carter	606-437-5100	Mayor
Paul Maynard	606-437-6236	Emergency Manager
Rebecca Hamilton	606-437-5100	City Clerk
Phillip Reed	606-444-5144	Police Chief
Ronald Conn	606-437-5125	Fire Chief
Robert Smith	606-437-5176	Floodplain Coordinator
JOHNSON COUNTY	**Phone**	**Position**
Roger T. Daniel	606-789-2550	Judge Executive
Gary McClure	606-789-2260	Emergency Manager
Dwayne Price	606-789-3411	Sheriff
Mike Stafford	606-789-2564	PVA
Willard Burton	606-789-2576	Floodplain Coordinator
City of Paintsville	**Phone**	**Position**
Bob Porter	606-789-2600	Mayor
Gary McClure	606-789-2260	Emergency Manager
Virgie Castle	606-789-2600	City Clerk
Steve Sluss	606-789-2603	Police Chief
Richard Ratliff	606-789-7376	Fire Chief
Bob Stewart	606-789-2600	Floodplain Coordinator
MAGOFFIN COUNTY	**Phone**	**Position**
Charles Hardin	606-349-2313	Judge Executive
Mike Wilson	606-349-2313	Emergency Manager
Carson Montgomery	606-349-2914	Sheriff
Jerry Swiney	606-349-6198	PVA
Frankie Collette	606-349-2313	Floodplain Coordinator
City of Salyersville	**Phone**	**Position**
Pete Shepherd	606-349-2409	Mayor
Paul Howard	606-791-3256	Emergency Manager
Carlotta Howard	606-349-2409	City Clerk
Matthew Watson	606-349-3255	Police Chief
Paul Howard	606-349-3254	Fire Chief
Pete Shepherd	606-349-2409	Floodplain Coordinator

Big Sandy Area Utilities

Name	County	Water Service	Sewer Service
Southern Water & Sewer	Floyd	Yes	Yes
Prestonsburg Utilities	Floyd	Yes	Yes
Martin Water Works	Floyd	Yes	Yes
Francis Water Company	Floyd	Yes	No
Wheelwright Utilities	Floyd	Yes	Yes
Pikeville Water Dept.	Pike	Yes	No
Elkhorn City Water Dept.	Pike	Yes	Yes
Mountain Water District	Pike	Yes	Yes
Ratliff Family Enterprises	Pike	Yes	No
Paintsville Utilities	Johnson	Yes	Yes
Magoffin County Water District	Magoffin	Yes	No
Salyersville Water Works	Magoffin	Yes	Yes
Martin County Water District	Martin	Yes	Yes

2.5 SUMMARY OF THE MULTI-JURISDICTIONAL PLANNING PROCESS

The Regional Mitigation Committee had final approval on each phase of the planning process with the recommendations of each county's committee. The regional committee reviewed the risk assessment and mitigation strategy and made the final decision on the material used in the plan. BSADD staff shared those findings and made copies available to the public. Updates of the local mitigation committee meetings were given to the BSADD Board of Directors at their monthly meetings by BSADD employee, Brandon Montgomery. The Regional Committee was also responsible for establishing the plan's maintenance procedures and approval of the plan's contents. BSADD was responsible for leading the committees through the plan development and also writing the plan.

The local county mitigation managers and the local officials of the BSADD Regional Committee participated in every phase of the planning process. They fulfilled the required public involvement processes and procedures of the contract. They were instrumental in providing invaluable information needed to write the Hazard Profiles, Risk Assessment and Mitigation Strategies sections of the plan. The county mitigation officials help provided information to BSADD staff on the historic and technical events needed to complete the hazard identification, profiling of events, and the vulnerability assessment portion of the text. Emergency Managers reviewed all information as researched by the BSADD staff on their communities prior to submission to the regional mitigation committee and inclusion in the plan. The local mitigation committees were under the guidance of each county emergency manager and assisted by BSADD Project Developer, Brandon Montgomery and Jamie Pinson (GIS Technician).

Information of updating the plan began with emails and phone calls in December 2014. Attempts were made to schedule an initial meeting in December and January and a meeting was scheduled in February 2015. Winter storms kept local emergency managers busy and roads icy for much of February and forced the Big Sandy ADD to postpone an initial meeting with the regions Emergency Management Directors until April 1st, 2015. Four of the five local emergency managers were able to attend and the "roadmap" was laid out for the entire update process. Our full "kickoff meeting" was held on May 26th 2015 and while lightly attended did provide the means for the committee to initiate the planning and preparation needed to begin the project. County level public meetings began in September and concluded in November. Meeting documentation, minutes, maps, attendance records, and information reviewed and used has been filed at the BSADD office in Prestonsburg, Ky.

CHAPTER 3: THE PLANNING PROCESS

While units of government, the Big Sandy Area Development District Board of Directors and the Regional Mitigation Committee were closely involved with this planning process, this document is a result of and owned by the citizens of the area. Through local planning and the grass roots method of data collection this plan is a document for the common vision of a safer more prepared region regarding emergencies associated with natural disasters. Although this plan has been compiled for submission, the pursuit of obtaining additional information and input from local citizenry, major areas of interest, results from public meetings and broader community input has produced a detailed regional approach toward

Hazard Mitigation. The following sections describe the planning processes used in the creation of the Big Sandy Regional Hazard Mitigation Plan.

3.1 Open Public Involvement

The public was invited to each and every county and regional meeting that occurred over the last entirety of the planning process. Announcements were published in the various local newspapers in the region (The Mountain Citizen, The Floyd County Times, Appalachian News Express, The Salyersville Independent and The Paintsville Herald.) Announcements ran on local television stations and over the radio as well. Announcements were made over WQHY, WSIP, WDHR, WMMT and WRLV radio stations that covered all five counties in the ADD service area and TV announcements were used in Magoffin County through Howard's Cable, fulfilling the required "notifying the public of mitigation meetings and giving noticed of the meetings outside of our service area" clause of our contract. The meetings were held after normal business hours as a means to encourage and provide the public with best opportunity to voice their opinion in regards to the plan. The public was encouraged to provide any historical data or information they found relevant or that our office and other agencies were deficient in. Public officials, BSADD Board of Directors, emergency management, public service departments as well were all invited to participate and many that could not be present in person contributed to the plan via phone calls and e-mails or through, unplanned, brief meetings throughout the planning period.

3.2 Opportunity for Public Comment

In order for the plan to contain accurate and historic information, the public was encouraged to be involved with the development of this plan. All meetings were publicized by submitting an announcement of the meetings to the various newspapers in the BSADD service area. The Appalachian News Express, Floyd County Times, the Mountain Citizen, the Salyersville Independent and the Paintsville Herald were utilized in advertising the public meeting. WQHY, WSIP, WDHR, WMMT and WRLV radio stations were also used to announce the meetings well in advance of the meeting date. When possible the meetings were also announced each month during the BSADD board meeting. Before each county/regional meetings, Mr. Montgomery called and/or e-mailed each participant to remind them of the county/regional meetings and to discuss/answer any questions about the agenda and plan. All county/regional meetings were open to the public for their input. Public input was encouraged during every stage of this update and is documented and woven throughout this document.

Before the draft and final plan were submitted to the state, the plan was made available to the public for their review and comment. The first public meeting was held immediately following the completion of the initial draft of the mitigation plan.

The second review occurred after the State Mitigation Officer reviewed and commented on the plan prior to plan approval by FEMA. As before, the meetings took place using the media campaign listed above. The mitigation plan was placed at city and county office, libraries, courthouses, health departments and BSADD's lobby with written permission from each agency. Information was provided directing the public to contact BSADD ADD staff to offer their comments and concerns. Once these options were exhausted, the BSADD ADD staff and the regional committee reviewed the comments received to determine their impact on the plan.

3.3 Opportunity for Public/Private Participation

Upon receiving this grant, Staff of the BSADD was charged with the development of the Hazard Mitigation Council to complete the planning process. Neighboring ADDs – specifically FIVCO ADD (for aid in the plan update process) were contacted about working together on the plan update. FIVCO employees Kelly Ward and Eric Patton were invaluable in aiding in the Big Sandy plan update. A handful of meetings were attended at both the Big Sandy and FIVCO ADD districts to discuss plan update procedures and to aid in information gathering and the sharing of update ideas. In addition to meetings, numerous phone calls and emails were exchanged over the 12-16 month update process between Big Sandy and FIVCO. In addition to the local ADDs, several other agencies participated or were notified of the update process as well. Any and all local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, businesses, academia and other private and non-profit interests were invited and encouraged to actively participate in the planning process. In addition to the obvious contacts of local Emergency Managers, Judges, and Mayors many others were offered the opportunity to attend: The Big Sandy Regional & Technical College, UPIke, Eastern Kentucky Region of the American Red Cross, U.S. Army Corps of Engineers, all utility providers, volunteer fire departments, regional Kentucky Emergency Managers, local hospitals, county road departments, health departments, and anyone in the service areas that each local radio station and newspaper could reach was notified of the meetings and of the plan update process. Staff reviewed the scope of work outlined in the grant application and the requirements of the Disaster Mitigation

Act of 2000 (DMA 2000). This Act clearly states that communities must participate in the process and adopt their portion of the plan in order to be eligible for disaster-related funds. This act also requires local governments to develop and submit pre-disaster mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) project funding. To satisfy these requirements staff began the process of organizing the council including representation of local elected officials for member jurisdictions of the district including Floyd, Johnson, Magoffin, Martin, and Pike Counties and incorporated cities of Allen, Prestonsburg, Martin, Wheelwright, Wayland, Paintsville, Salyersville, Inez, Warfield, Elkhorn City, Pikeville, and Coal Run.

During this process of council formation staff of the BSADD began envisioning a more distinctive need for regional preparedness throughout the multi jurisdictions that comprise the district. In order to make the region more prepared in the occurrence of a disaster or disaster related activities, staff developed the Big Sandy Regional Mitigation Preparedness Council. Staff envisioned a council that would include; County Judge Executives, Mayors, City Managers, Area KY Emergency Manager, County Emergency Managers, representatives of police, fire, rescue, ambulance services, representatives of local hospitals, representatives of utility providers including water, sewer, electric, and telephone companies, and other public and private representation that we felt could provide aid for the project. Public notices of the meetings were provided to local media. At each public meeting information of the planning process was provided. Each attendee was given the opportunity to voice their views, provide factual data, and to be active members of a sub-committees if they so desired. Meeting were held in each county and held during appropriate hours to provide the optimal participation of all the target groups to participate.

In the end the makeup of the Regional Preparedness Council provided a unique partnership between the private and public agencies of the district. This partnership challenges the different agencies, organizations, and individuals to come together in order to reduce or limit the impacts of a natural disaster. This partnership not only encourages participation of the council members but also encourages people throughout the district to work together in order to better prepare the region in the event of an emergency resulting from any and all disasters.

3.4 Review and Incorporation of Existing Plans, Studies, Reports, Technical Information

During the initial meetings for the 2016 plan update the Regional Hazard Mitigation Committee concluded they would like the plan to be a more “useable document” as they described it. The current plan was too bulky and difficult to reference in its current form. An entire plan overhaul was decided to be the best means of turning the plan into the document that the committee envisioned. The 2011 Big Sandy Area Development District Multi-Jurisdictional was cited heavily in the 2016 update and was utilized as means of tracking progress and goals for the hazard mitigation committee but a large portion of the plan that the committee deemed not needed would be removed along with duplicate data, maps and references the committee felt were not needed.

During the initial creation of the original plan and the plan update, staff of the BSADD turned to the Kentucky Hazard Mitigation Plan that was completed and approved during the completion of the initial Big Sandy Regional Hazard Mitigation Plan. The Kentucky State Plan completed by the Center for Hazards Research and Policy Development (CHR) at the University of Louisville, in close coordination with the Kentucky Division of Emergency Management (KYEM), the State Hazard Mitigation Officer (SHMO), and in cooperation with federal, state, and local stakeholders served as a guiding tool for the completion of the *initial* Big Sandy Regional Hazard Mitigation Plan. Staff of the BSADD utilized this plan by extracting data and information pertinent to the Big Sandy Region and making it compatible with the Region’s Hazard Mitigation Plan. Staff also worked closely with other Area Development Districts regarding information exchanges and plan formation.

Staff gathered and reviewed other existing regional and local plans that focused on Hazard Mitigation. Floyd County had previously prepared an individual Hazard Mitigation Plan prior to the start of this planning process. Staff worked to incorporate components of this plan with the regional plan. Staff also worked with the local Emergency Management Managers in order to collect data and information regarding past disasters. This information included impacts of these disasters and their agency responses to these disasters.

Staff also researched and collected data utilizing State and Federal Agencies outside the Big Sandy Regional Preparedness Council. FEMA past disaster declarations were utilized in the historical data, as well as used to assist in the calculations of potential loss estimations, and probability of future events.

Finally staff utilized the BSADD. The BSADD is a local planning district that is comprised of trained professionals who work together improving the Big Sandy Region. During this Hazard Mitigation Planning process, staff of the BSADD worked with

other planning and development bodies of the ADD including the following: the Area Agency on Aging, Transportation Committee, Highway Safety Committee, Regional KY Works, Mountain Housing Corporation, Big Sandy Water Management Council, Human Service Coordinating Council, and the Big Sandy Aging Advisory Council. These committees and boards were utilized along with other organizations and groups, to gather information and to provide input.

Three existing planning documents of the BSADD were critical in the formation of the Big Sandy Regional Hazard Mitigation Plan. These plans include the Comprehensive Economic Development Strategy (CEDS), Big Sandy Regional Water Management Plan, and Regional Highway Transportation Strategy including the Six Year Priority List.

(CEDS) is a comprehensive community based strategic planning process that fosters and guides growth in a manner so as to capitalize on the region's potential, ensuring that the region and its residents have the maximum opportunity of reaping positive benefits and seeing sound economic growth and community development. The plan consists of a compilation of area assessment information, demographic information; asset and liability mapping, in order complete an information scan of the region, analyze the region strengths and weaknesses, and develop goals and strategies for the region and its communities. The plan was created through similar process to that of the Big Sandy Regional Hazard Mitigation Plan encouraging public and private participation.

Big Sandy Regional Water Management Plan is a comprehensive planning document that focuses on three basic components including water supply, water distribution, and wastewater services of the region. The plan is dynamically progressive changing along with the Region's water and sewer service needs. The plan catalogues and maps existing systems for both water and wastewater services throughout the region. The plan also provides project lists and community needs for the region regarding water and wastewater. This planning process is an umbrella function of the Big Sandy Regional Water Management Council. The Council structure was a building block for staff in creating the Regional Mitigation Committee for the Hazard Mitigation Planning Process.

Regional Highway Transportation Strategy including the Six Year Priority List provided staff with detail relating to roads and bridges that could be potentially impacted by a disaster. The Strategy and Priority list also identifies specific projects for the region. The basis of identification for some of these projects includes escaping from repetitive flooding and potential landslides. The Big Sandy Regional Highway Transportation Committee and Big Sandy Regional Safety Committee are two strong functioning committees of the BSADD. These committees have been vital assets to the Hazard Mitigation Process.

3.5 DOCUMENTATION OF THE PLANNING PROCESS

Step one consisted of an overview of the five year update process. The members were briefed on the requirements of the five year update as representatives of their respective jurisdictions in matters relating to the specific sections of the Regional Hazard Mitigation Plan. This briefing along with the addition of appropriately necessary additional members including county and regional DEM officers and County and City Road foremen were invaluable in forming the plan update and providing useful data. The Big Sandy ADD staff coordinated the interaction of the various agencies and units of local government in order to develop the needed partnerships for completion of step one. The planning committee assisted with the assignment of responsibilities, information exchange, and establishment of procedures for plan development. The committees held meetings in the county seat of each county and solicited public participation as well as participation of each jurisdiction located in the respective counties. The public input from these meetings resulted in the inclusion of information ranging from identification of hazards through local input, to historical data, development areas, critical facilities location review and updates, reoccurring damage areas, potential mitigation projects and mitigation activities. Documentation of this input including attendance sign-in sheets, minutes, completed survey documents, notes, working maps, and historical data sets are filed at the Big Sandy ADD Office, 110 Resource Court, Prestonsburg, KY 41653.

The Regional Mitigation Committee provided oversight during each phase of the plan development, provided guidance to the sub committees and supplied information to the Big Sandy ADD Board of Directors through reports prepared by staff. The RPC also provided the thorough review of the risk assessment findings and mitigation strategy input from the Big Sandy ADD staff and committees.

Step two of the planning process was to reassess risks. All components of the Risk Assessment were compiled using best available data in the Big Sandy ADD district from several sources. Arc Map was used along with HAZUS MH in the risk assessment process. The Regional Mitigation Committee, with public input and local knowledge, was responsible for review of proposed goals and objectives, mitigation activities, development trend areas, prioritization of actions, maintenance procedures, evaluation steps, and monitoring of the plan. Hazards were identified using existing best available data. Data was obtained from the Federal Emergency Management Agency (FEMA); the National Oceanic and Atmospheric Association (NOAA); the National Flood Insurance Program; the United State Geological Survey; the Kentucky Geological

Survey; the Kentucky Department of Natural Resources, Division of Water; the Kentucky Division of Forestry; the National Forest Service; the National Weather Service; local officials, local DEM officers, County and City personnel, and citizens at large. Staff compiled the hazards database draft using the data gathered from these sources among others and presented the information to the RPC and finally to the Big Sandy ADD Board of Directors. The mitigation committees were under the guidance of each county Emergency Manager and assisted by Brandon Montgomery, Project Developer with the Big Sandy ADD and Jamie Pinson, GIS Technician. A meeting was held in each county and also when needed to meet the terms or our contract. The local committees participated at the regional level as well. Meeting documentation, notes, minutes, maps, sign-in sheets, and information reviewed at the meetings in in the possession of the Big Sandy ADD. The initial draft review was done with public input at the RPC level, and identified hazards were updated after this initial review and upon substantiation. The Vulnerability assessments were conducted under this step and came from a combination of historical data, and input from local leaders, and Disaster and Emergency Management personnel. Census data, data from HAZUS, local input, NOAA data, KY Division of Water data, FEMA data, KY Division of Forestry data, USGS, KGS, and others were used in the compilation of the map data, identification data, critical facilities data, and historical data for the risk assessments. The estimate of potential losses was calculated using historical data, structure points that were mapped in all five counties and twelve cities and formulas developed from local officials using existing known values as well as from HAZUS MH for the flood module.

Step three reevaluated the regions goals for the plan, readdressed priorities, updated the capacity information for the communities to meet the goals and developed a list of potential funding sources for each identified goal. Projects that were in the original plan and have been completed either through construction or implementation were denoted within the plan as reflected in the individual projects database as well as reported in the regional section of the overall priorities.

The Big Sandy ADD staff was directly involved in all phases of the planning process. Brandon Montgomery managed the planning project. He also guided the county/regional committees through the hazard profile, vulnerability assessment and risk assessment portions of the plan and also helped develop committee structure and guided the participants through the development of the mitigation strategy, helped establish the plan of maintenance and assured the plan's adoption by each jurisdiction.

Mr. Jamie Pinson provided GIS support required to develop the plan. He provided the research necessary to identify hazards, profiling of hazard events, assessing vulnerabilities and identifying assets. Using ARC Info software, he used the best available GIS resources including Census data, available Parcel Valuation Administration (PVA) data, HAZUS-HM and other resources as required to produce maps, charts and graphs as needed to illustrate and communicate the findings of the research to the mitigation committees. Mr. Pinson with his extensive knowledge in GIS information format, helped collect and prepare the Risk Assessment section of this plan. From those findings, the mitigation strategies were developed to address the identified hazards area.

Step four provided for formal adoption of the plan, identified actions for implementation, and outlined the mechanisms for monitoring, evaluating and updating the plan. It also provided for continued public participation through open meetings. The Regional Mitigation Plan update includes a timeline for regular review and monitoring of the plan, methods of following the developed maintenance procedures, an update timeline, including revised evaluation criteria

3.6 DOCUMENTATION OF THE PLAN UPDATE

During the update process of this plan, a section by section review was conducted by Big Sandy ADD staff members and county emergency management staff. Each section in which issues were found was reassessed and any updates were made pending a final review by local Emergency Management personnel.

Planning Process

No immediate concern was seen to update this portion of the plan though all pertinent data such as FEMA suggested revisions, all out of date maps, map data, and charts and local officials and committee members were revised as need to ensure the plan was accurate. The planning process was reviewed by all five County Emergency Management Directors with consent from their corresponding County Judge Executives and Mayors, so the same process was used to update the plan. Public involvement was also sought in much the same format to better speed up plan development.

Risk Assessment

The primary concern with the Risk Assessment section of the plan update was the high level of time sensitive data that it contained. It was discovered that parcel data drastically needed to be updated in order to better assess potential losses from hazards such as flooding and landslides. All of the identified hazards in this plan were reviewed by County

Emergency Management Staff and other team members. After the review, all time sensitive data including event location and information was updated, flood maps were updated when possible, and the sections concerning drought, wind events, severe winter storms, earthquakes and tornadoes were updated. Each map was updated to ensure the most up to date information was used. No new hazards were added and none were removed.

County Emergency Management Directors reviewed all of their recent historical emergency data and talked to other members (Judges, Mayors, Police, Fire, citizens) from their respective counties to gain knowledge about past hazards and current hazards. The Big Sandy ADD staff looked in local newspapers and researched the internet to ensure the plan update had all current and necessary data. Final efforts came from consulting with personnel at the National Oceanic and Atmospheric Administration and the National Forest Service for updated GIS data when available

Mitigation Strategy

Other than updating the data contained in the charts, tables, and general text in this section, much of this portion of the plan was deemed to be up to date and acceptable by the planning team. Concerns from KYEM staff were addressed but otherwise little of this section was changed.

Current mitigation goals were found to still be relevant to the plan although the previous version of the plan lacked in-depth analysis into a lot of the goals local EMs found relevant. That section was overhauled and drastically expanded to illustrate the multiple projects, plans and goals local counties and EM Directions have for the region. At the discretion of the County Emergency Management staff some of the goals were deferred or their amounts lessened due to budget cuts at the local level and lack of funding due to the lessening of available state and federal aid. It was generally agreed that with as additional channels for funding become available, this area of the plan should be revisited.

Plan Maintenance

For the time being, no direct need to update this section of the plan was seen pending the review of this plan by KYEM and FEMA. Because of the decision to overhaul the plan to make it more accessible and less repetitive and more efficient it is the plan and hope of the planning committee that this will allow updates to the plan to occur more frequently and more effectively. Specific options for future maintenance were addressed. It was decided that the best course of action for plan maintenance was to provide updates on a constant basis rather than using the cycle used by FEMA for plan updates. This option will remain open as long as funds are available.

CHAPTER 4: RISK ASSESSMENT

Big Sandy Area Development District staff worked collaboratively with the Regional Mitigation Committee utilizing data and information obtained during the risk assessment process to formulate a risk assessment regarding potential impacts of natural hazards on the multi-jurisdictions collectively represented during this planning process. The purpose of the Risk Assessment is to allow the Regional Mitigation Committee and BSADD staff to establish mitigation strategies and guiding principles for the Big Sandy Region. The following sections explain the formation of the Risk Assessment.

[3]4.1 IDENTIFYING HAZARDS

The first step in the Risk Assessment Process involves the identification and analyzation of natural hazards and their impacts in the region. In order to complete this process a list of all natural hazards were obtained from FEMA by BSADD staff. BSADD staff and Regional Mitigation Committee reviewed the list of identified natural hazards and determined which of these hazards would most likely affect the Big Sandy Region. Data collection was utilized from the FEMA Publication 386-2, Understanding Your Risk, and section 1, as referencing guidelines in these determinations. Other factoring components the BSADD staff utilized were the geographic location of the Big Sandy Region, historical occurrences of these disasters, and potential of occurrence for these disasters.

Hazards were identified using existing best available data from a wide variety of sources. Resources used during the determination process of this section included the following: Kentucky State Hazard Mitigation Plan, Federal Emergency Management Agency (FEMA); the National Oceanic and Atmospheric Association (NOAA); the National Climatic Data Center; the National Weather Service, the United State Geological Survey; the Kentucky Geological Survey; the Kentucky Department of Natural Resources, Kentucky Emergency Management Regional Manager; Division of Water; the Kentucky

[3] Special acknowledgement to Demetrio P. Zourarakis from the Kentucky Division of Geographic Information for helping with mapping and data retrieval for the plan update.

Division of Forestry; the National Forest Service; the local officials, local DEM officers, County and City personnel, and citizens at large.

The following is a table that identifies the potential impacting hazards of the Big Sandy Region. The table also provides prioritization levels identified during the plan update. To further explain the reasoning for selection and prioritization of hazards for the Big Sandy Region, the table displays information regarding how and why each of the hazards were chosen.

Flooding	Drought	Hurricane	Tsunami
Volcano	Wildfire	Earthquake	Winter Storm
Tornado	Thunderstorm	Sever Wind	Dam Failure
Landslide	Hail		

The following charts show the breakdown of what hazards were chosen by the committee and basis for the decisions:

HAZARDS THAT AFFECT THE BSADD REGION

HAZARD	HOW IDENTIFIED	WHY IDENTIFIED
Flooding	•Past disaster declarations & Past events • Input from local officials/residents •Review of FIRMS •NFIP repetitive loss properties in region	• Flooding occurs nearly every year in the region. Property damage and loss of life occur frequently. • Federal disaster declarations each of the last four years.
Severe Winter Storm	•Past disaster declarations •Input from local officials/residents •Past events	• Winter storms frequently cause property damage in the BSADD region. • Recent disaster declarations due to ice storms.
Landslide	• Input from state/local officials • USGS	• Extremely common in the region • Often occurs hand in hand with flooding
Tornado	• Past events & Input from local officials • National Climatic Data Center	• History of property damage due to tornados • Probability statistics show susceptibility
Wildfire	• State Division of Forestry • Input from local officials	• Numerous occurrences yearly within the BSADD region
Earthquake	• USGS & Past events	• PGA for BSADD region is in the 3 to 4 range.
Thunderstorm/Severe Wind	• Past events & Input from local officials • National Climatic Data Center	• Frequent occurrence and frequent property damage.
Drought	• Input from local officials • National Climatic Data Center • Agriculture Extension Agents • Midwest Regional Climate Center	• Droughts occur periodically and are primarily a threat to agricultural production.
Hail	•Past disaster declarations & Past events • Input from local officials/residents	• Hail occurs periodically and can cause severe property and crop damage.
Dam Failure	• Kentucky Division of Water • National Performance of	• Two major dams in region, and many smaller dams pose a potential threat to property

HAZARDS THAT *DO NOT* AFFECT THE BSADD REGION

HAZARD	HOW IDENTIFIED	WHY NOT CHOSEN
Tsunami	• National Climatic Data Center	• BSADD region is not in a coastal region • No historical occurrences
Hurricane	• National Climatic Data Center	• BSADD region is not in a coastal region. • No historical occurrences.
Volcano	• Kentucky Geological Survey • United States Geological Survey	• No active volcanoes near BSADD region. • No historical occurrences.

[4]4.2 PROFILING HAZARDS EVENTS

FLOODING (4.2.1)

Flooding is the most frequent and costly natural hazard in the United States. Flooding is the greatest problem and threat to the BSADD region. Floods are the result of excessive precipitation, and are classified under two categories: Flash floods which are the result of heavy localized precipitation in a short time period over a particular location and general flooding, which is caused by precipitation over a longer time period and over a given geographical area.

Flash flooding is characterized by a rapid rise in water level, high velocity and large amounts of debris. Major factors in flash flooding are the intensity and duration of rainfall and the steepness of watershed and stream gradients. The amount of watershed vegetation, the natural and artificial flood storage areas and the configuration of the streambed and floodplain are also factors. Flash floods may also result from the failure of a dam or the sudden breakup of an ice jam. They are capable of tearing out trees, undermining buildings and bridges and scouring new channels.

General floods are long-term events and may last for several days. The primary types of general flooding are riverine, coastal, and urban flooding.

Riverine flooding is the product of excessive precipitation levels and high water runoff volumes within the watershed of a stream or river. Over bank flooding of rivers and streams is the most common type of flood event. Flooding in large rivers usually results from large-scale weather systems generating prolonged rainfall over wide areas. These same weather systems can cause flooding in smaller basins that drain to major rivers.

Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor'easters and other large coastal storms. This type of flooding does not affect the BSADD region due to our inland continental location.

Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff. The BSADD region has numerous urban areas prone to flooding.

Several factors determine severity of floods, including rainfall intensity (or other water source) and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas. Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover.

Frequency of inundation depends on the climate, soil, and channel slope. In regions where substantial precipitation occurs in a particular season each year, or in regions where annual flooding is derived principally from snowmelt, the floodplains may be inundated nearly every year. In regions without extended periods of below-freezing temperatures, floods usually occur in the season of highest precipitation. In areas where flooding is caused by melting snow, and occasionally compounded by rainfall, the flood season is spring or early summer.

The 100-year flood designation applies to the area that has a 1 percent chance, on average, of flooding in any given year. However, a 100-year flood could occur two years in a row, or once every 10 years. The 100-year flood is also referred to as the base flood. The base flood is the standard that has been adopted for the NFIP. It is a national standard that represents a compromise between minor floods and the greatest flood likely to occur in a given area and provides a useful benchmark. The following maps show the areas in Floyd, Pike, Johnson, Magoffin, and Martin Counties that are within the 100 year flood zone.

Located along the Big Sandy River and bisected by numerous small rivers and streams, flooding is inherent to the region. The topography of the region consists of steep sloping hills separated by narrow drainage. This topography makes flash flooding a major issue as the narrow drainages often struggle to dispense the volume of water that a substantial rainfall generates as it quickly runs off of the steep hillsides. These issues are often exacerbated by deforestation and development that speeds up the pace of runoff and decreases the amount of absorption thus causing both the volume of water and the speed at which it is entering the drainage system to increase. In many cases the drainage system is further hindered by blockages in the stream channel by debris, heavy siltation, or even beaver dams.

Flooding of areas alongside rivers and streams is natural and inevitable, however this is often misunderstood. Development of areas within mapped floodplains continues to occur. As such development occurs it increases the loss potential and the danger to people who live and work in these areas. Recent floodplain management reports issued by FEMA and the

[4] All hazard data taken from www.ncdc.noaa.gov

Kentucky Division of Water indicate that our region has in many cases failed to properly manage growth within floodplains. Upon this notification, immediate attention has been given to improve floodplain management practices in local jurisdictions throughout the region. Within the BSADD region there are many homes and structures located within mapped flood prone areas. There are also many locations with repetitive flooding problems that are not located within a mapped floodplain.

The following Flooding hazard base maps were created for each jurisdiction by BSADD staff using FEMA Q3 digital floodplain data and the aforementioned in house created data. These base maps were used as a starting point and additional flood information was added. Sources of additional flood data include NFIP repetitive loss locations, BSADD's in house maintained GIS database of disaster locations, and input from local government officials and citizens.

EFFECTIVE FLOODPLAIN STUDIES/MAPS/PARTICIPATION IN NFIP/ FOR THE BIG SANDY REGION

All Local Mitigation Plans approved by FEMA after October 1, 2008 must describe each jurisdiction's participation in the NFIP and must identify, analyze and prioritize actions related to continued compliance with the NFIP. Basic compliance NFIP actions could include, but are not limited to:

- Adoption and enforcement of floodplain management requirements, including regulating all new and substantially improved construction in Special Flood Hazard Areas (SFHAs);
- Floodplain identification and mapping, including any local requests for map updates, if needed; or,
- Description of community assistance and monitoring activities

Participation in the NFIP is based on a voluntary agreement between a community and FEMA. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include 1) floodplain identification and mapping risk 2) responsible floodplain management and 3) flood insurance. Minimum compliance actions include the following:

Floodplain identification and mapping

- Maintenance of publicly accessible copy of effective FIRM (flood insurance rate map) maps and FIS (flood insurance study)
- Adopt most current DFIRM or FIRM and FIS
- Support of local requests for map updates
- Share with FEMA any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data
- Assistance with local floodplain determinations
- Maintain a record of approved Letters of Map Change

Floodplain management

- Adopt a compliant floodplain management ordinance that at a minimum regulates the following:
  - Issue permits for all proposed development in the SFHA
  - Obtain, review and utilize any Base Flood Elevation and floodway data, and require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres
  - Identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the Base Flood Elevation, including anchoring, using flood resistant materials, designing or locating utilities and service facilities to prevent water damage
  - Document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures.
- Enforce the ordinance by monitoring compliance and taking remedial action to correct violations
- Consider adoption of activities that extend beyond the minimum requirements, including those identified for participation in the Community Rating System, freeboard, prohibition of production or storage of chemicals in SFHA, prohibition of certain types of structures such as: hospitals, nursing homes, jails, prohibition of certain types of residential housing such as manufactured homes, and finally floodplain ordinances that prohibit any new residential or non-residential structures in the SFHA.

Flood Insurance

- Educate community members about the availability and value of flood insurance
- Inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates
- Provide general assistance to community members relating to insurance issues

Effective Floodplain Maps

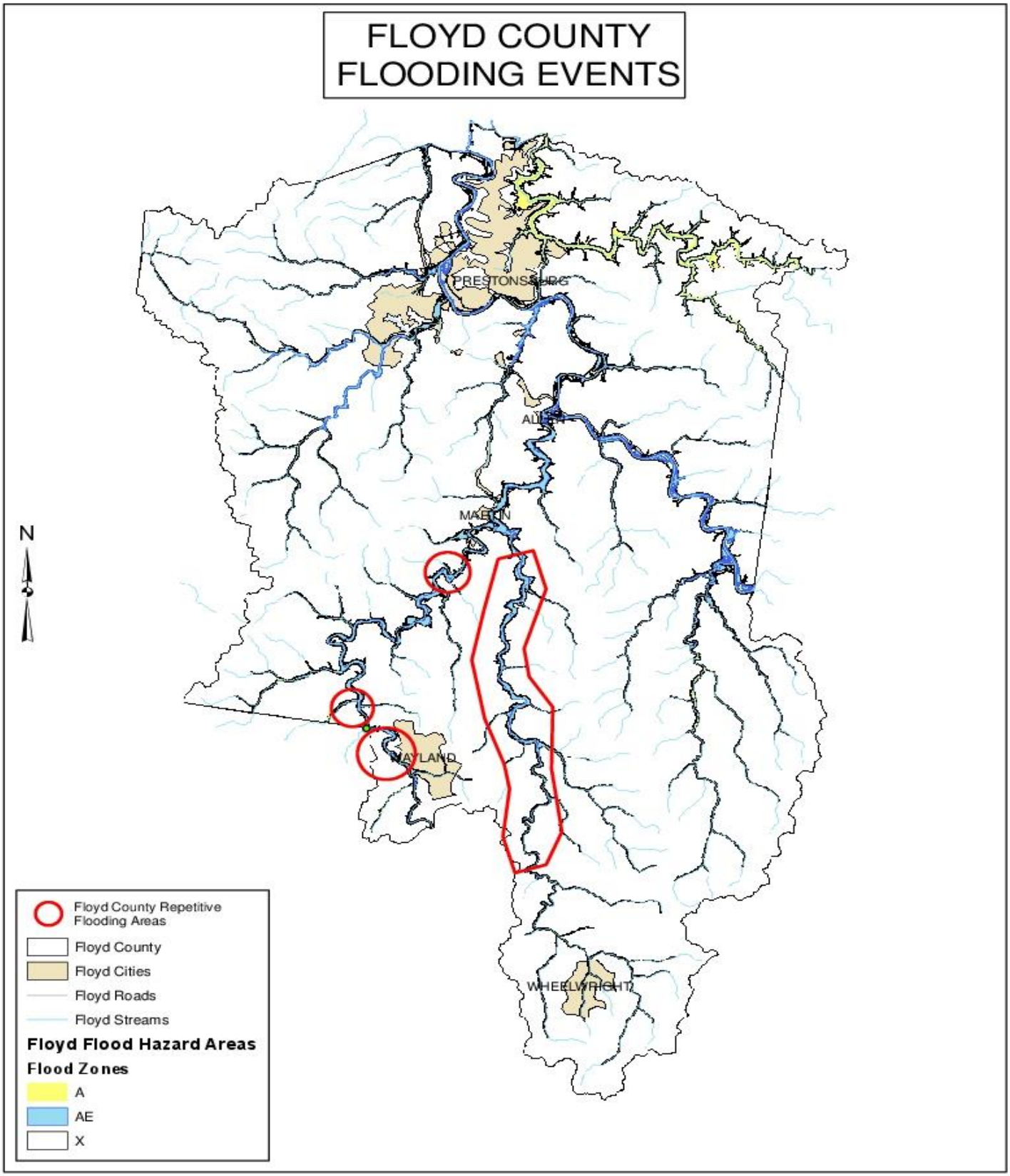
Entity	Effective Date
Floyd County	
City of Allen	03/19/1990
City of Martin	09/16/2015
City of Prestonsburg	09/16/2015
City of Wayland	09/16/2015
City of Wheelwright	n/a
Unincorporated Areas	09/16/2015
Pike County	
City of Coal Run	04/16/2013
Elkhorn City	04/16/2013
City of Pikeville	04/16/2013
Unincorporated Areas	04/16/2013
Johnson County	
City of Paintsville	11/02/1990
Unincorporated Areas	05/04/1988
Magoffin County	
City of Salyersville	01/02/2013
Unincorporated Areas	01/02/2013
Martin County	
City of Inez	08/05/2010
City of Warfield	08/05/2010
Unincorporated Areas	08/05/2010

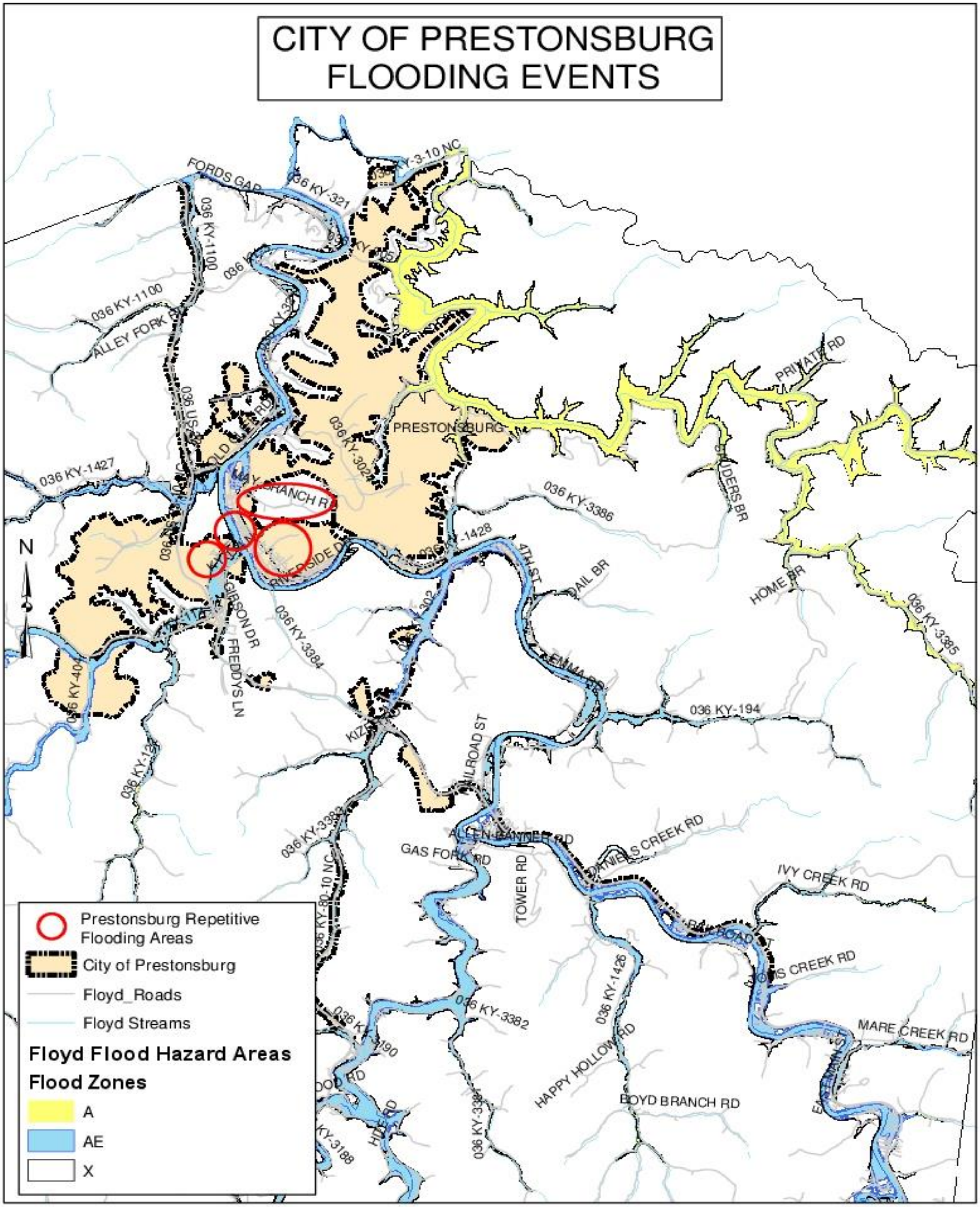
The NFIP also provides the CRS or Community Rating System that is a voluntary program that rewards community efforts through reductions on flood insurance premiums. The basis for communities to qualify for this program includes establishment of improved floodplain management activities through community actions reducing flood loses, facilitate accurate insurance rating, and promote the awareness of flood insurances. CRS can reduce cost of flood insurance 5% for each designation of class. There are 9 classes in the CRS system beginning with class 9 as the lowest amount of % saved at 5% through class 1 that is the highest % saved at 45%.

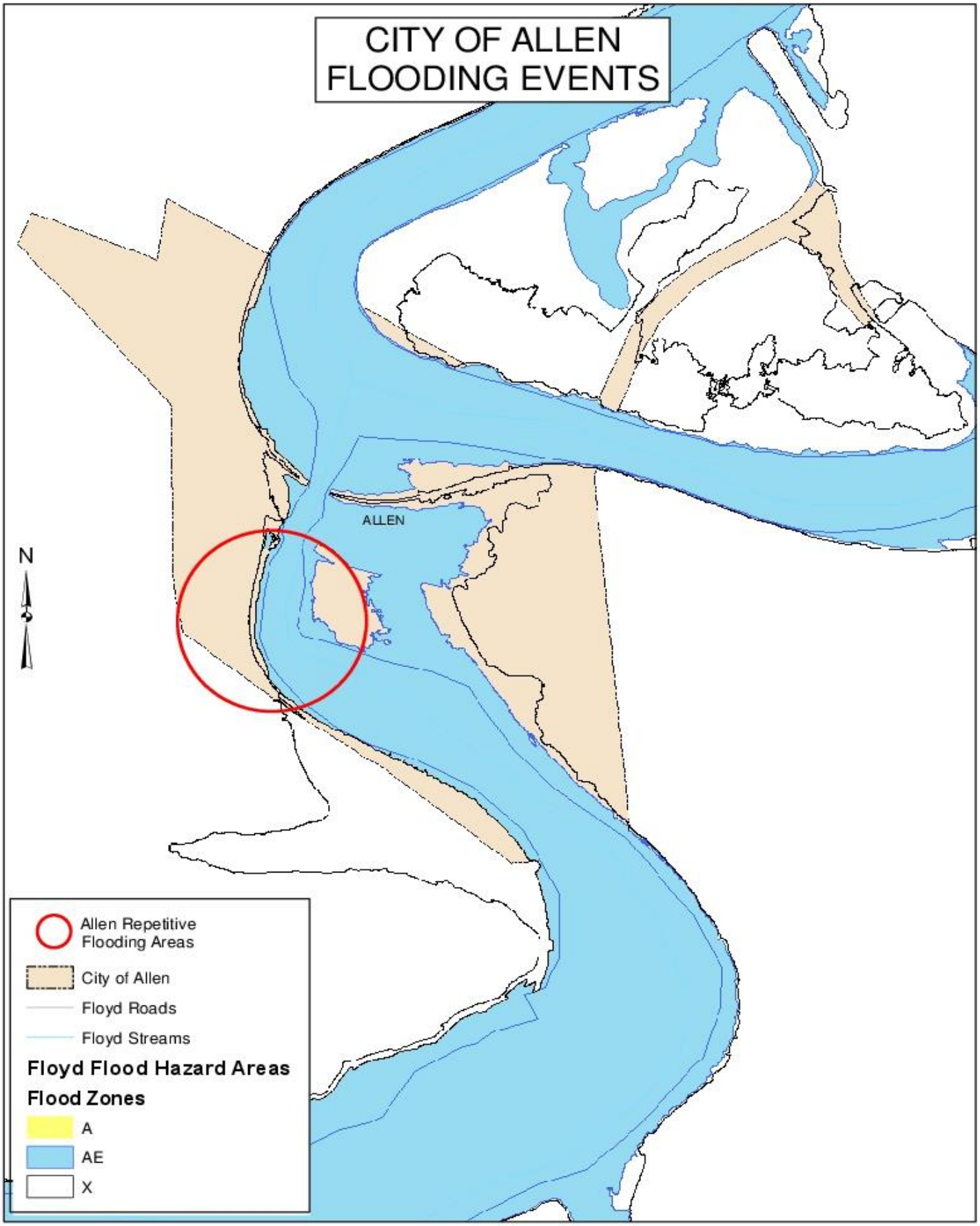
The Big Sandy Area Development District currently has 4 members participating in the CRS program. The table below illustrates the CRS statuses and displays these participating communities. The table also displays community number, community name, entry date, effective date, class and status.

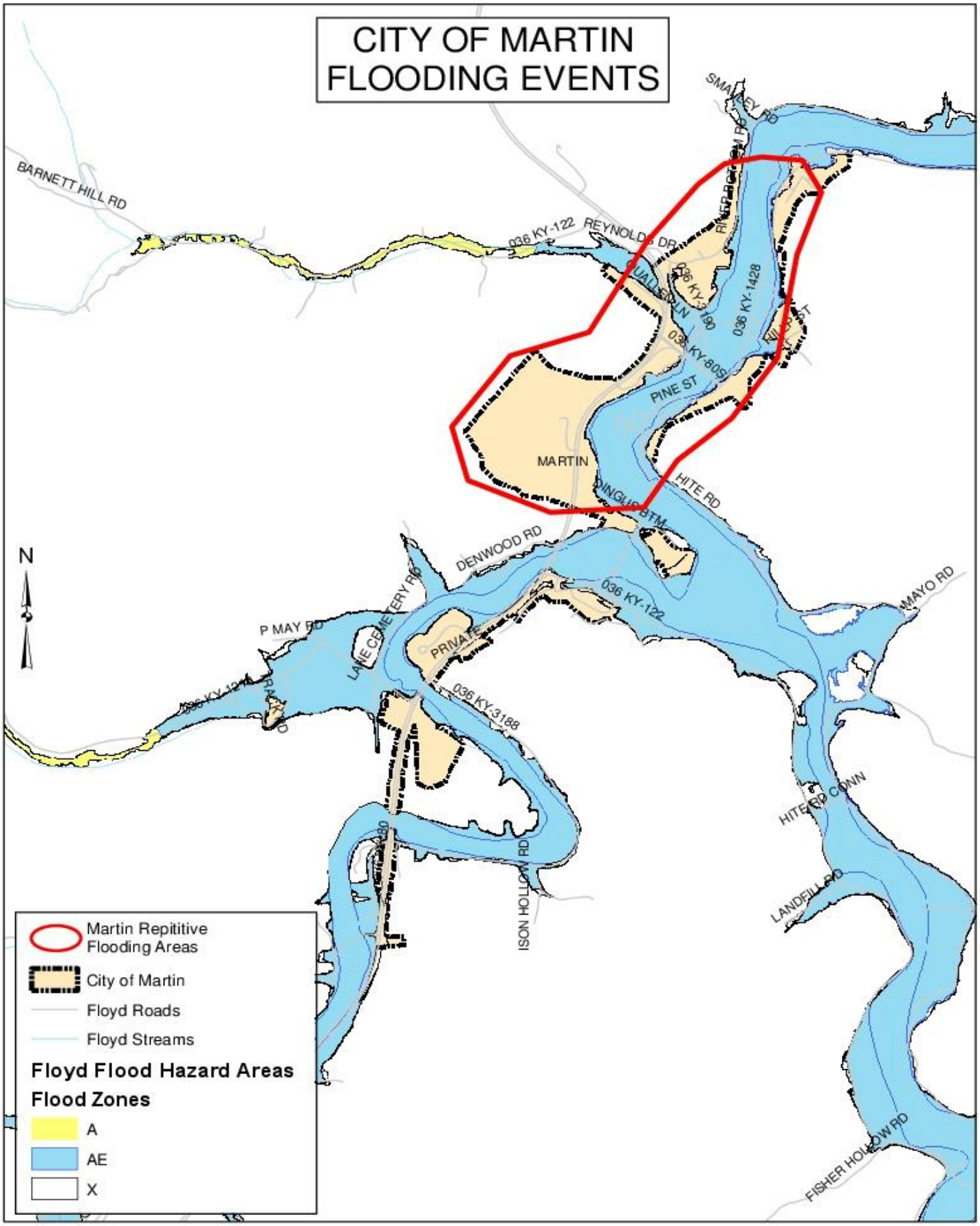
COMMUNITY RATING SYSTEM MEMBERS IN THE BIG SANDY REGION

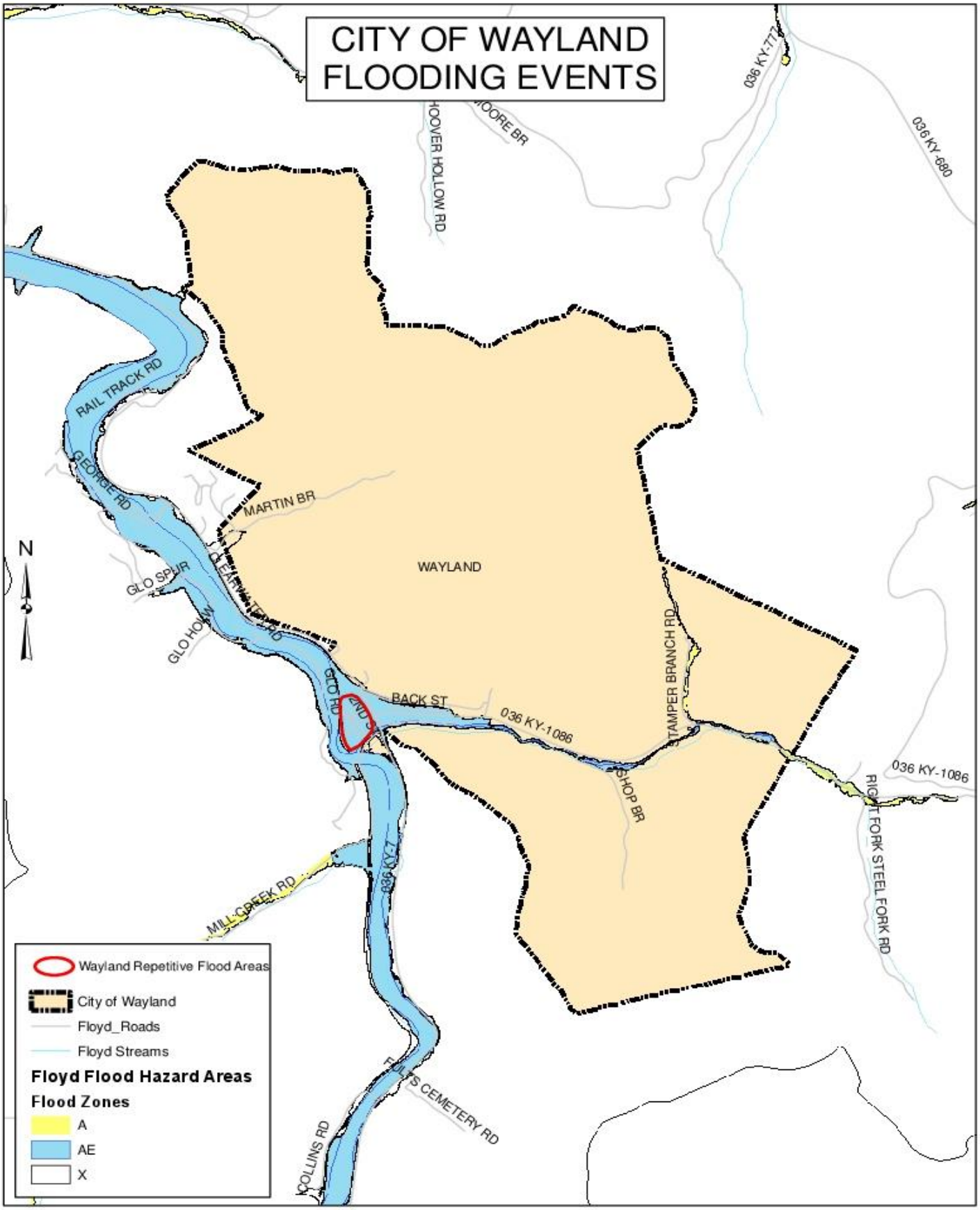
Community No.	Community Name	Entry Date	Effective Date	Class	Status
210298	Pike County	10/01/1995	10/01/1995	9	C
210193	City of Pikeville	10/01/1992	10/01/1992	9	C
210072	City of Prestonsburg	10/01/1992	10/01/2009	10	R
210127	City of Paintsville	10/01/1992	10/01/1992	9	C

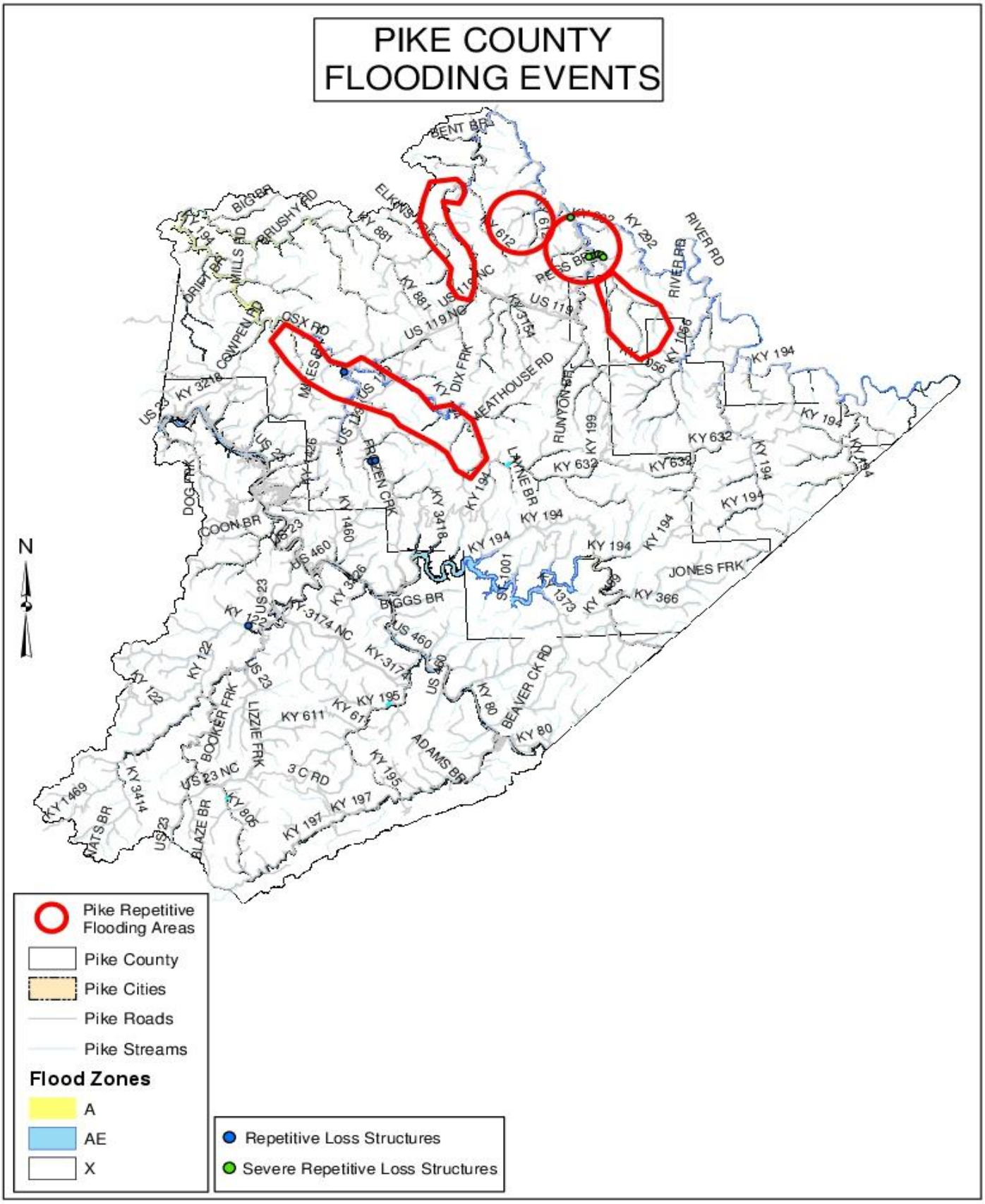

FLOYD COUNTY
FLOODING EVENTS
PRESTONSBURG
MAYLAND
WHEELWRIGHT
N
Floyd County Repetitive Flooding Areas
Floyd County
Floyd Cities
Floyd Roads
Floyd Streams
Floyd Flood Hazard Areas
Flood Zones
A
AE
X

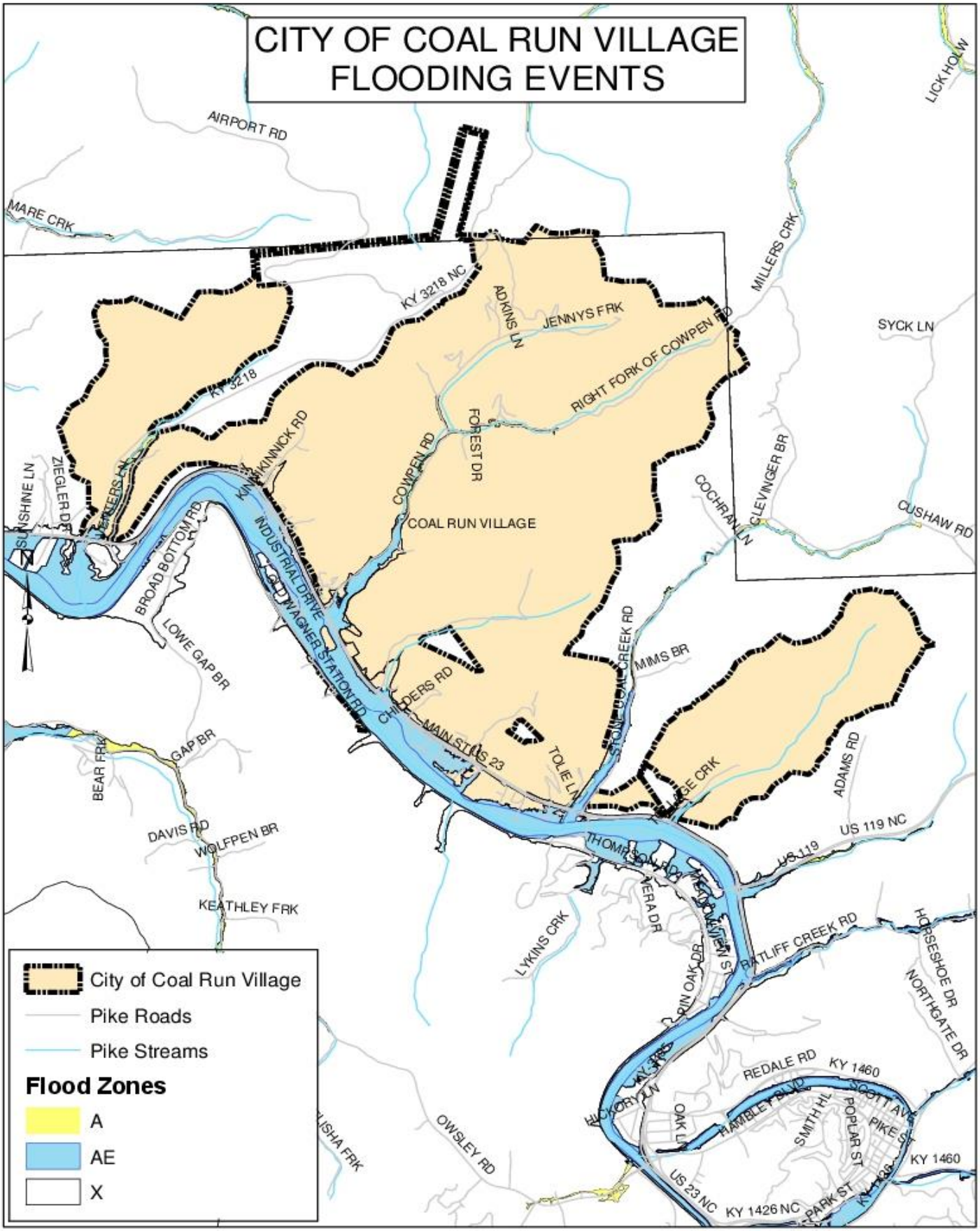

CITY OF PRESTONSBURG
FLOODING EVENTS
Prestonsburg Repetitive Flooding Areas
City of Prestonsburg
Floyd_Roads
Floyd Streams
Floyd Flood Hazard Areas
Flood Zones
A
AE
X
N
PRESTONSBURG
036 KY-1427
036 KY-1100
ALLEY FORK
036 KY-3386
036 KY-3384
036 KY-194
036 KY-3385
036 KY-3382
036 KY-1426
036 KY-3383
036 KY-3188
HOME BR
GIBSON DR
FREDDYS LN
GAS FORK RD
TOWER RD
IVY CREEK RD
MARE CREEK RD
BOYD BRANCH RD
HAPPY HOLLOW RD
PRIVATE RD
FORDS GAP
036 KY-321
036 KY-3-10 NC
036 KY-302

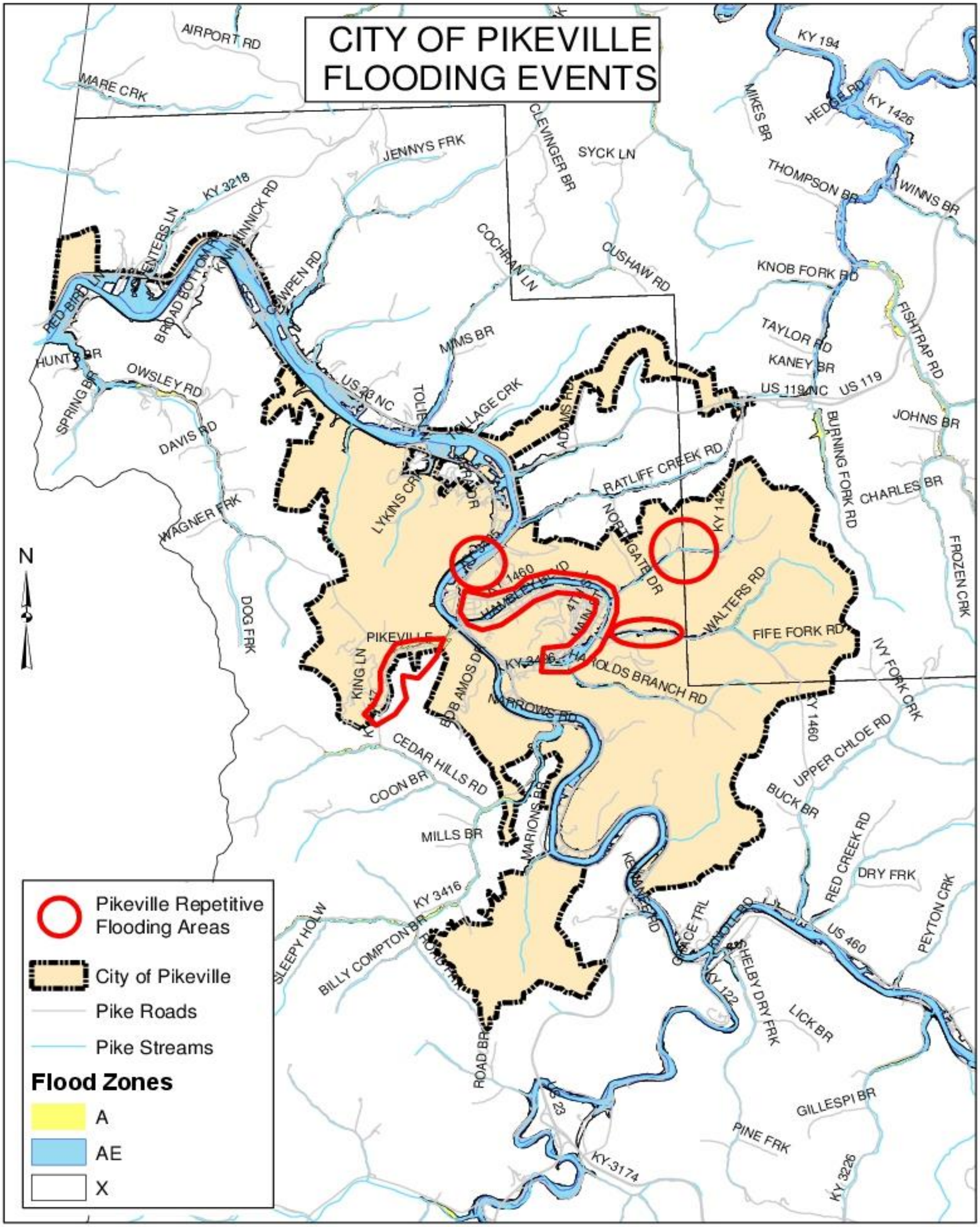

CITY OF ALLEN
FLOODING EVENTS
ALLEN
N
Allen Repetitive Flooding Areas
City of Allen
Floyd Roads
Floyd Streams
Floyd Flood Hazard Areas
Flood Zones
A
AE
X

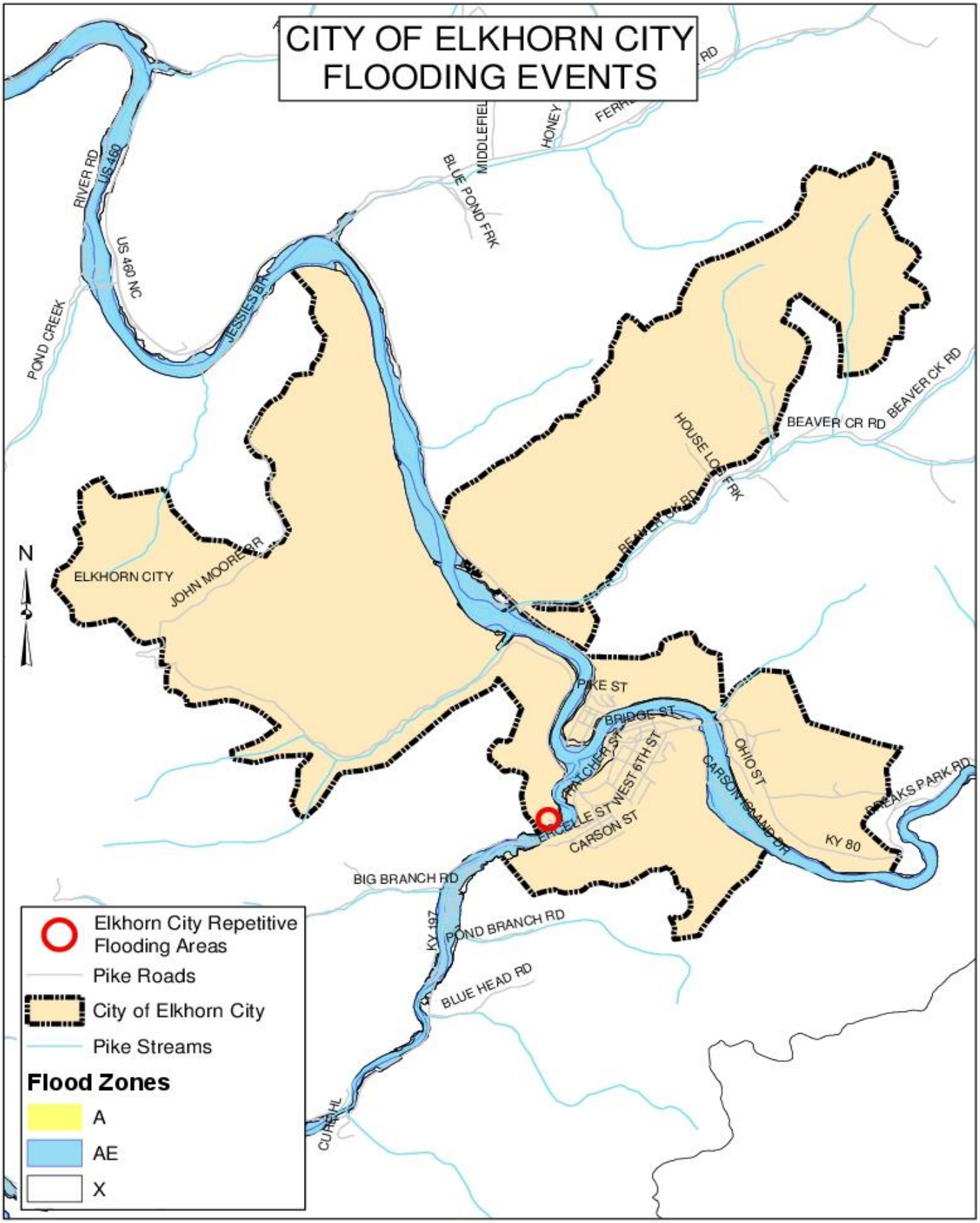

CITY OF MARTIN
FLOODING EVENTS
BARNETT HILL RD
036 KY-122
REYNOLDS DR
036 KY-3190
036 KY-1428
036 KY-805
PINE ST
MARTIN
HITE RD
DENWOOD RD
036 KY-122
MAYO RD
P MAY RD
LAKE CEMETERY RD
PRIVATE
036 KY-3188
ISON HOLLOW RD
HITE RD CONN
LANDFILL RD
FISHER HOLLOW RD
N
Martin Repititive Flooding Areas
City of Martin
Floyd Roads
Floyd Streams
Floyd Flood Hazard Areas
Flood Zones
A
AE
X

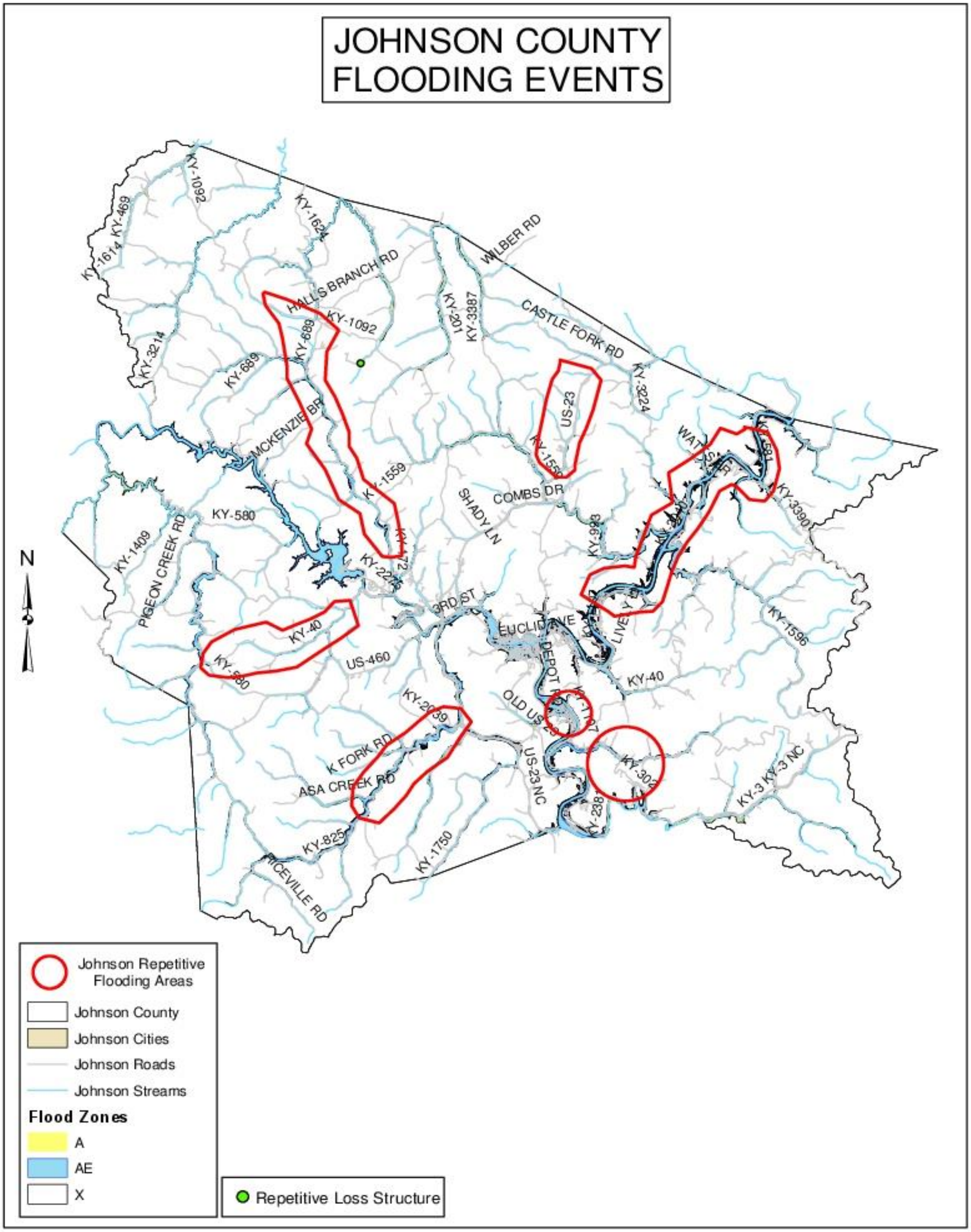

CITY OF WAYLAND
FLOODING EVENTS
036 KY-772
036 KY-680
HOOVER HOLLOW RD
MOORE BR
RAIL TRACK RD
GEORGE RD
MARTIN BR
WAYLAND
N
GLO SPUR
GLO HOLLOW RD
GLO RD
BACK ST
036 KY-1086
STAMPER BRANCH RD
BISHOP BR
036 KY-1086
RIGHT FORK STEEL FORK RD
036 KY-7
MILL CREEK RD
FULTS CEMETERY RD
COLLINS RD
Wayland Repetitive Flood Areas
City of Wayland
Floyd_Roads
Floyd Streams
Floyd Flood Hazard Areas
Flood Zones
A
AE
X

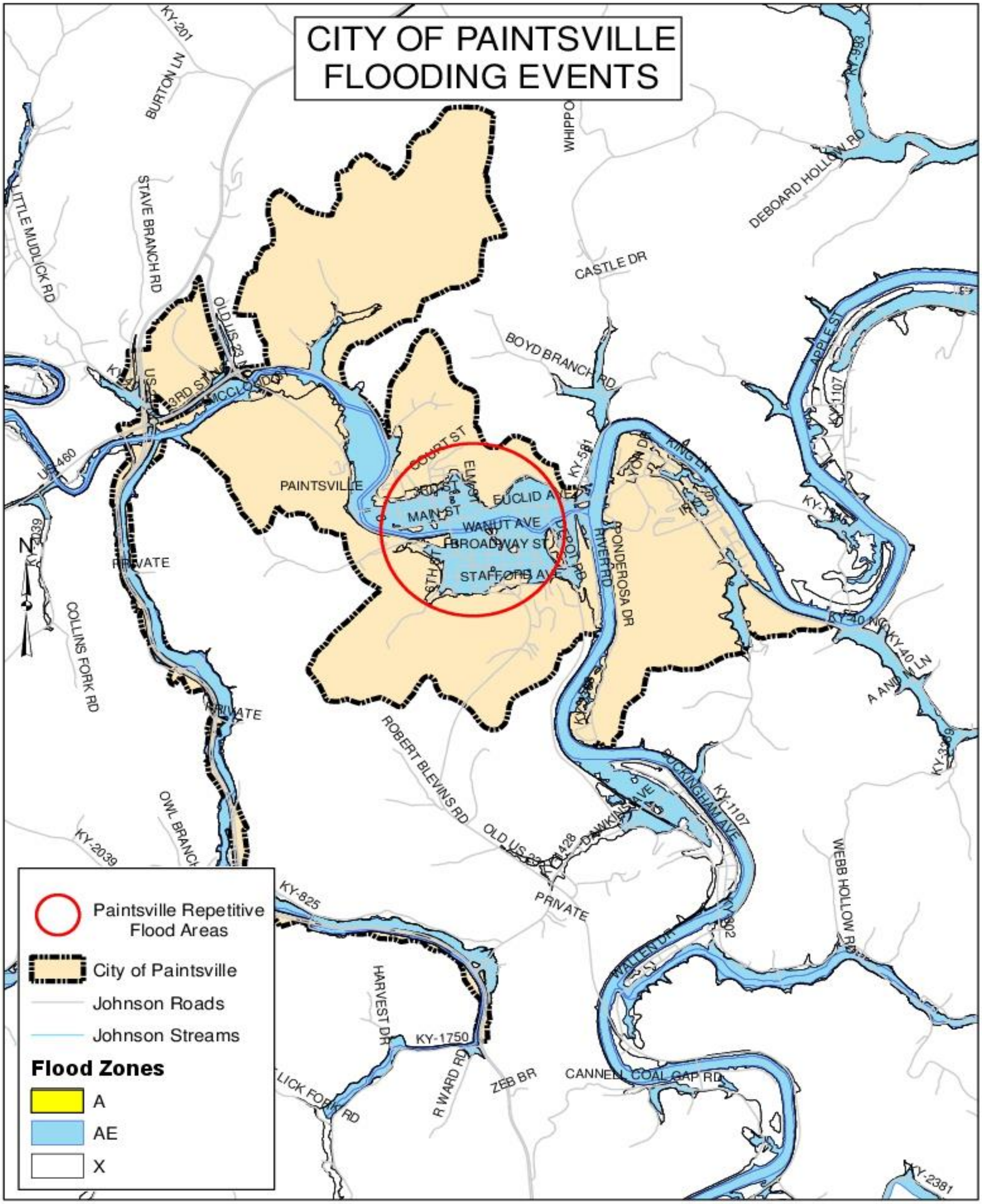

PIKE COUNTY
FLOODING EVENTS
N
Pike Repetitive Flooding Areas
Pike County
Pike Cities
Pike Roads
Pike Streams
Flood Zones
A
AE
X
Repetitive Loss Structures
Severe Repetitive Loss Structures

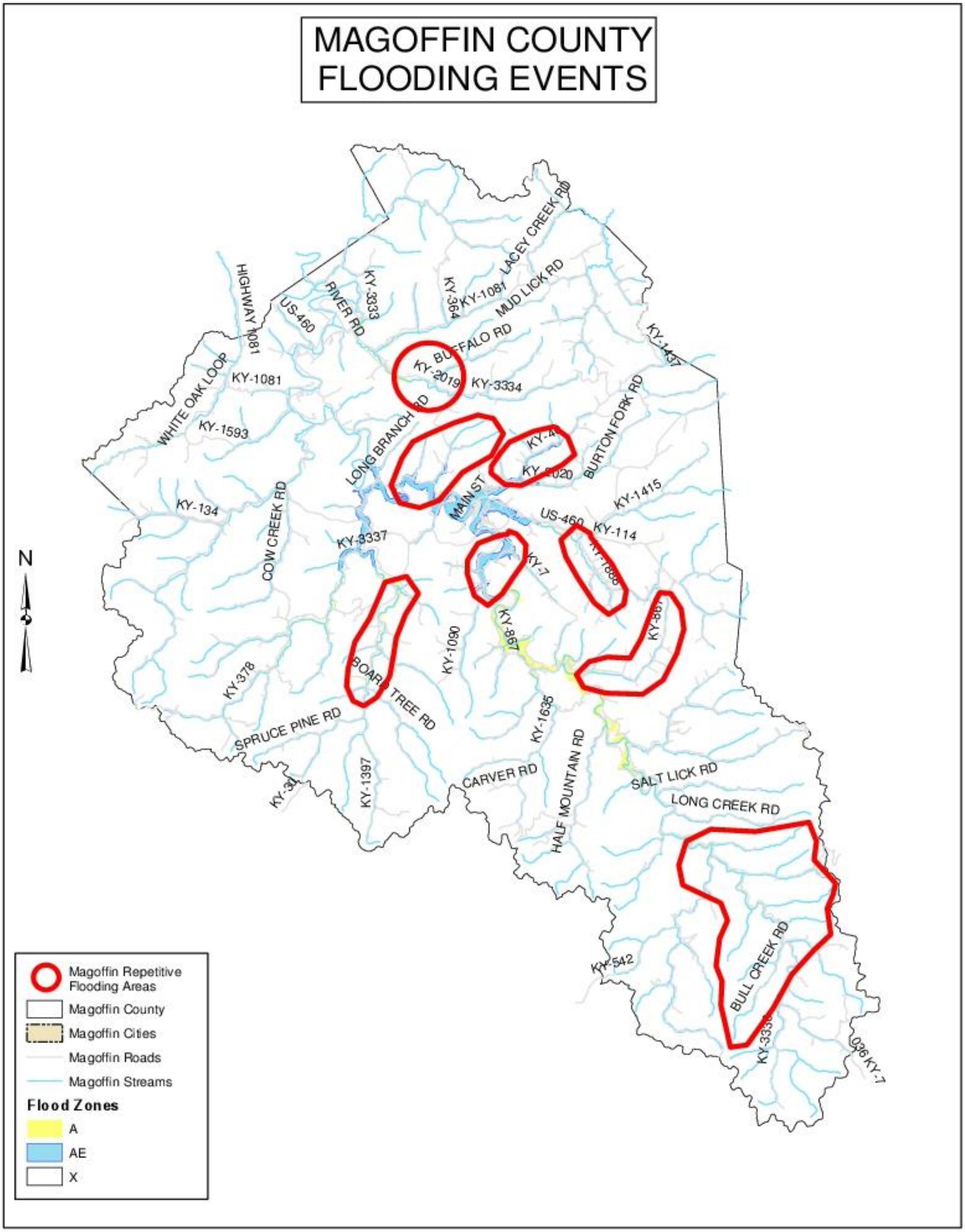

CITY OF COAL RUN VILLAGE
FLOODING EVENTS
AIRPORT RD
MARE CRK
LICK HOLW
MILLERS CRK
KY 3218 NC
KY 3218
ADKINS LN
JENNYS FRK
RIGHT FORK OF COWPEN RD
SYCK LN
FOREST DR
COWPEN RD
KINSKINNICK RD
ZIEGLER DR
SUNSHINE LN
COCHRAN LN
CLEVINGER BR
CUSHAW RD
COAL RUN VILLAGE
BROAD BOTTOM RD
INDUSTRIAL DRIVE
OLD WAGNER STATION RD
LOWE GAP BR
CHILDERS RD
MAIN ST US 23
STONE COAL CREEK RD
MIMS BR
TOLIE LN
ADAMS RD
BEAR FRK
GAP BR
DAVIS RD
WOLFPEN BR
KEATHLEY FRK
THOMPSON RD
US 119
US 119 NC
VERA DR
LYKINS CRK
RATLIFF CREEK RD
HORSESHOE DR
NORTHGATE DR
REDALE RD
KY 1460
OAK LN
HAMBLEY BLVD
SMITH HL
POPLAR ST
PIKE ST
SCOTT AVE
OWSLEY RD
US 23 NC
KY 1426 NC
PARK ST
City of Coal Run Village
Pike Roads
Pike Streams
Flood Zones
A
AE
X

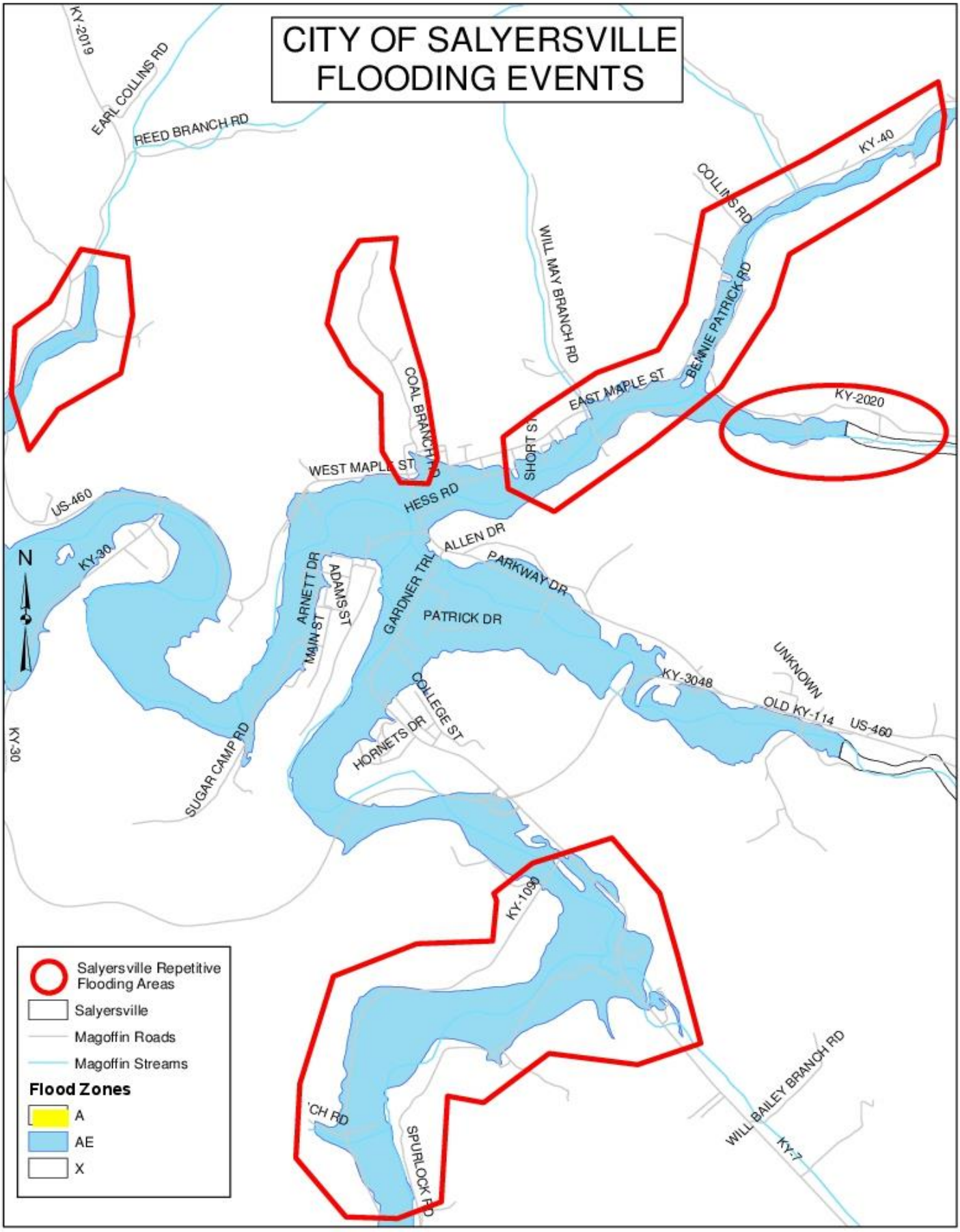

CITY OF PIKEVILLE
FLOODING EVENTS
Pikeville Repetitive Flooding Areas
City of Pikeville
Pike Roads
Pike Streams
Flood Zones
A
AE
X
N
AIRPORT RD
MARE CRK
JENNYS FRK
KY 3218
CLEVINGER BR
SYCK LN
MIKES BR
KY 194
HEDGE RD
KY 1426
THOMPSON BR
WINNS BR
COCHRAN LN
CUSHAW RD
KNOB FORK RD
TAYLOR RD
KANEY BR
US 119 NC
US 119
FISHTRAP RD
JOHNS BR
BURNING FORK RD
CHARLES BR
FROZEN CRK
RATLIFF CREEK RD
MIMS BR
US 23 NC
OWSLEY RD
DAVIS RD
WAGNER FRK
DOG FRK
LYKINS CR
NORTHGATE DR
WALTERS RD
FIFE FORK RD
IVY FORK CRK
PIKEVILLE
KING LN
BOB AMOS DR
HAROLDS BRANCH RD
NARROWS RD
CEDAR HILLS RD
COON BR
MILLS BR
UPPER CHLOE RD
BUCK BR
RED CREEK RD
DRY FRK
PEYTON CRK
US 460
KY 3416
SLEEPY HOLW
BILLY COMPTON BR
ROAD BR
SHELBY DRY FRK
LICK BR
GILLESPI BR
PINE FRK
KY-3174
KY 3226
SPRING BR
DAVIS RD

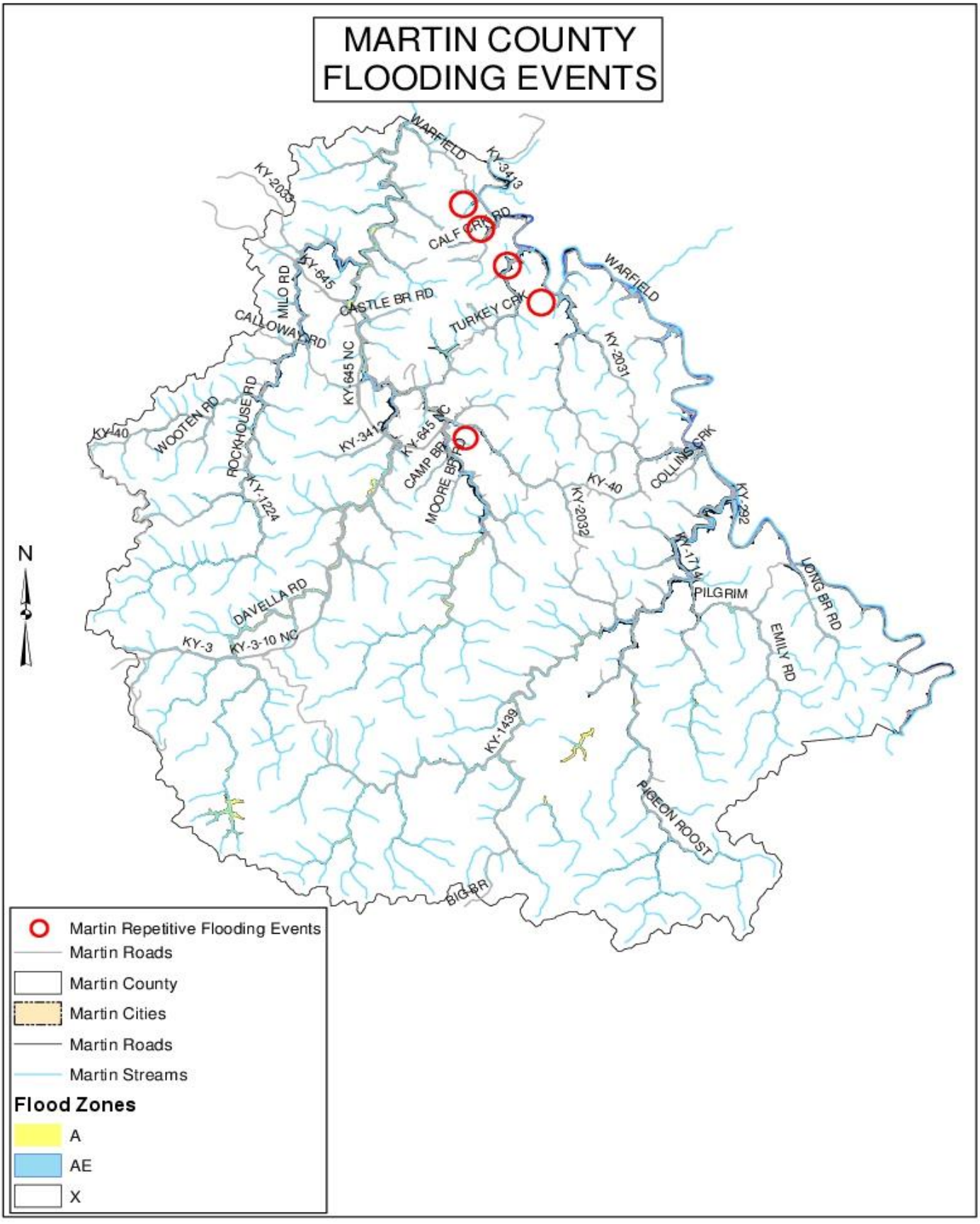

CITY OF ELKHORN CITY
FLOODING EVENTS
RIVER RD
US 460
US 460 NC
POND CREEK
JESSIES BR
BLUE POND FRK
MIDDLEFIEL
HONEY
FERR
RD
HOUSE LOG FRK
BEAVER CR RD
BEAVER CK RD
BEAVER CK RD
ELKHORN CITY
JOHN MOORE BR
N
PIKE ST
BRIDGE ST
FLETCHER ST
WEST 6TH ST
OHIO ST
CARSON ISLAND DR
BREAKS PARK RD
KY 80
ERCELLE ST
CARSON ST
BIG BRANCH RD
KY 197
POND BRANCH RD
BLUE HEAD RD
CURRY HL
Elkhorn City Repetitive Flooding Areas
Pike Roads
City of Elkhorn City
Pike Streams
Flood Zones
A
AE
X

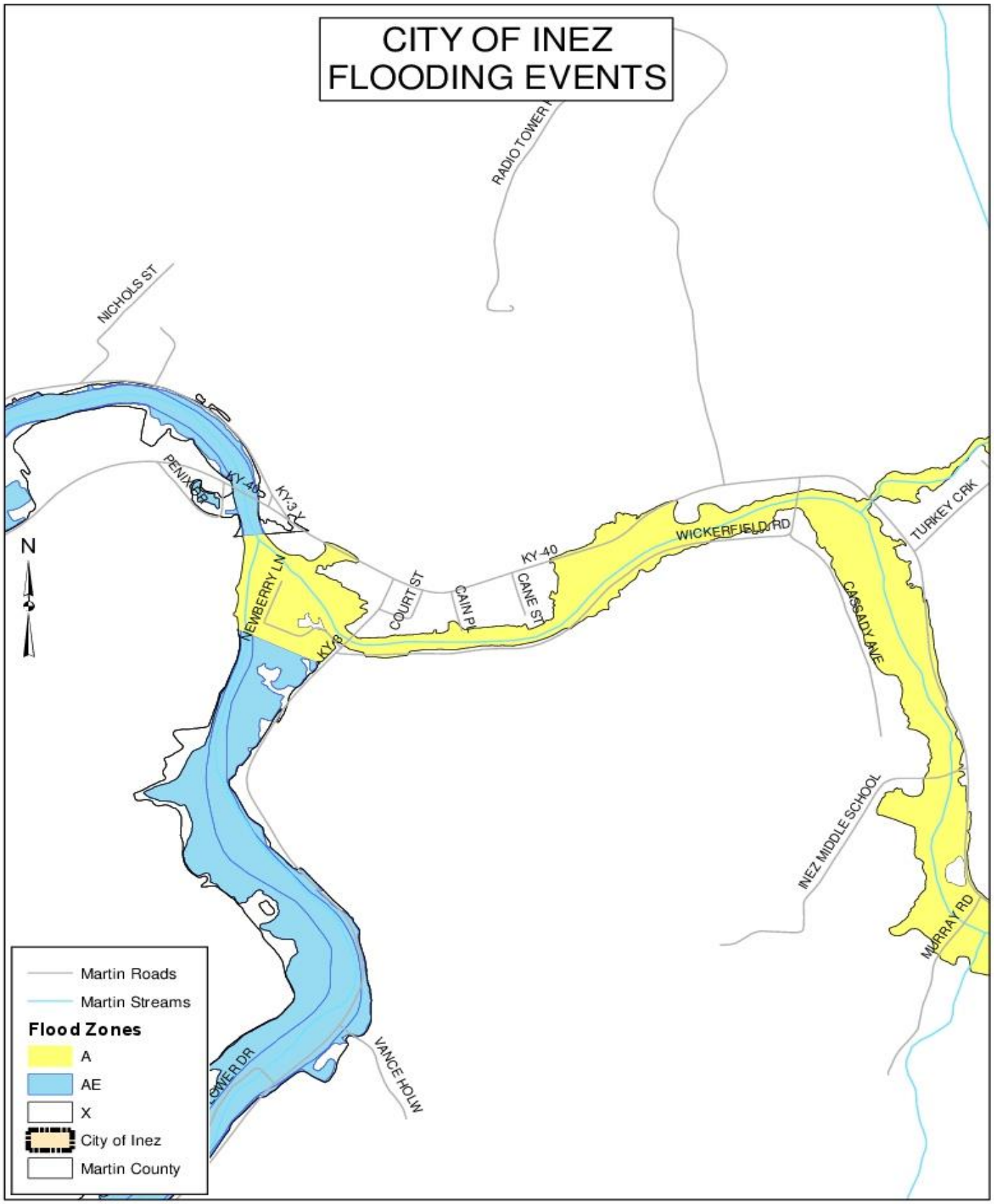

JOHNSON COUNTY
FLOODING EVENTS
KY-1092
KY-469
KY-1614
KY-1624
HALLS BRANCH RD
WILBER RD
KY-201
KY-3387
CASTLE FORK RD
KY-3214
KY-689
KY-1092
US-23
KY-3224
MCKENZIE BR
KY-1559
COMBS DR
SHADY LN
KY-580
KY-1409
PIGEON CREEK RD
KY-993
KY-3390
KY-1596
3RD ST
EUCLID AVE
DEPOT RD
KY-40
US-460
KY-40
OLD US 23
US-23 NC
K FORK RD
ASA CREEK RD
KY-825
KY-1750
RICEVILLE RD
KY-3 KY-3 NC
N
Johnson Repetitive Flooding Areas
Johnson County
Johnson Cities
Johnson Roads
Johnson Streams
Flood Zones
A
AE
X
Repetitive Loss Structure

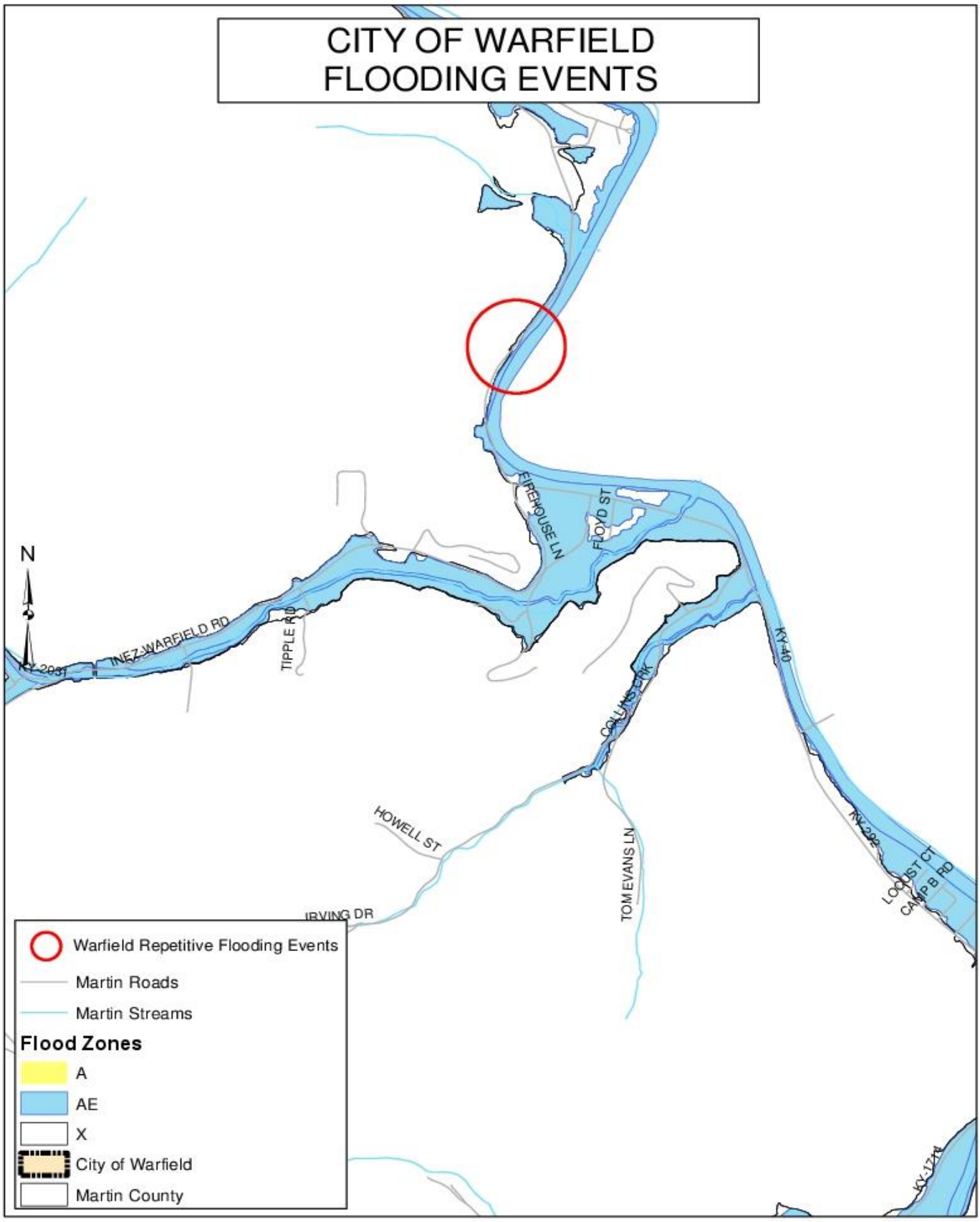

CITY OF PAINTSVILLE
FLOODING EVENTS
Paintsville Repetitive Flood Areas
City of Paintsville
Johnson Roads
Johnson Streams
Flood Zones
A
AE
X
PAINTSVILLE
MAIN ST
WALNUT AVE
BROADWAY ST
EUCLID AVE
COURT ST
DEBOARD HOLLOW RD
CASTLE DR
BOYD BRANCH RD
STAVE BRANCH RD
BURTON LN
COLLINS FORK RD
ROBERT BLEVINS RD
WEBB HOLLOW RD
PONDEROSA DR
HARVEST DR
ZEB BR
CANNEL COAL GAP RD
KY-825
KY-1750
KY-2039
KY-201
KY-1107
KY-2381
PRIVATE

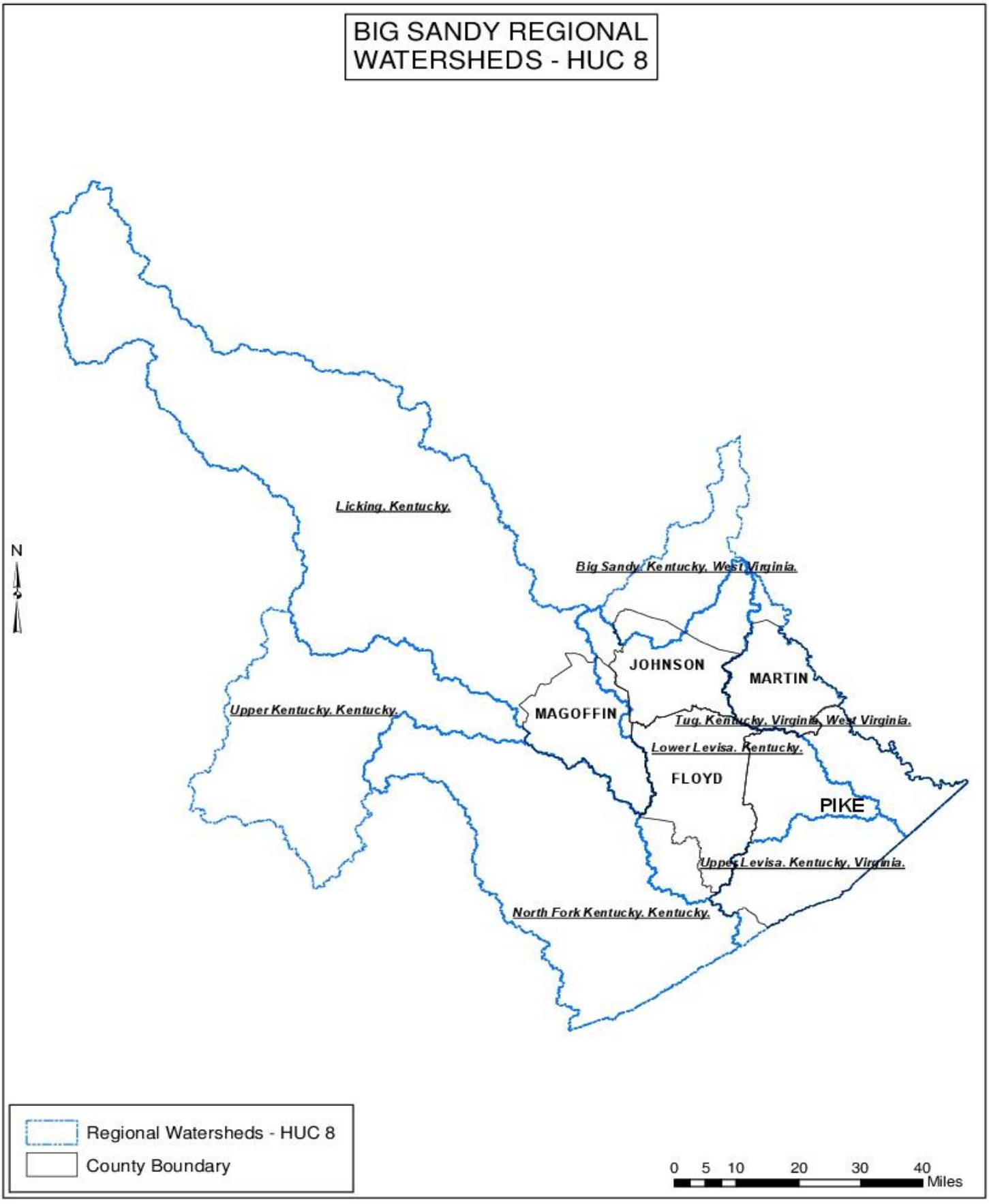

MAGOFFIN COUNTY
FLOODING EVENTS
LACEY CREEK RD
MUD LICK RD
KY-1081
KY-364
KY-3333
RIVER RD
US-460
HIGHWAY 1081
BUFFALO RD
KY-2019
KY-3334
KY-1081
WHITE OAK LOOP
KY-1593
LONG BRANCH RD
BURTON FORK RD
KY-1437
MAIN ST
KY-1415
US-460
KY-114
KY-134
COW CREEK RD
KY-3337
KY-7
KY-867
KY-1090
KY-378
TREE RD
SPRUCE PINE RD
KY-1635
HALF MOUNTAIN RD
SALT LICK RD
LONG CREEK RD
CARVER RD
KY-1397
BULL CREEK RD
KY-542
N
Magoffin Repetitive Flooding Areas
Magoffin County
Magoffin Cities
Magoffin Roads
Magoffin Streams
Flood Zones
A
AE
X


CITY OF SALYERSVILLE
FLOODING EVENTS
KY-2019
EARL COLLINS RD
REED BRANCH RD
KY-40
COLLINS RD
WILL MAY BRANCH RD
BENNIE PATRICK RD
EAST MAPLE ST
SHORT ST
KY-2020
COAL BRANCH RD
WEST MAPLE ST
HESS RD
US-460
KY-30
N
ALLEN DR
PARKWAY DR
GARDNER TRL
ARNETT DR
ADAMS ST
MAIN ST
PATRICK DR
UNKNOWN
KY-3048
OLD KY-114
US-460
COLLEGE ST
HORNETS DR
SUGAR CAMP RD
KY-30
KY-1090
SPURLOCK RD
WILL BAILEY BRANCH RD
KY-7
Salyersville Repetitive Flooding Areas
Salyersville
Magoffin Roads
Magoffin Streams
Flood Zones
A
AE
X


MARTIN COUNTY
FLOODING EVENTS
WARFIELD
KY-3413
KY-2039
CALF CRK RD
KY-645
MILO RD
CASTLE BR RD
TURKEY CRK
WARFIELD
CALLOWAY RD
KY-645 NC
KY-2031
WOOTEN RD
ROCKHOUSE RD
KY-40
KY-3412
KY-645 NC
CAMP BR RD
MOORE BR RD
KY-40
COLLINS CRK
KY-292
KY-1224
KY-2032
KY-1714
PILGRIM
LONG BR RD
DAVELLA RD
KY-3
KY-3-10 NC
EMILY RD
KY-1439
PIGEON ROOST
BIG BR
N
Martin Repetitive Flooding Events
Martin Roads
Martin County
Martin Cities
Martin Roads
Martin Streams
Flood Zones
A
AE
X


CITY OF INEZ
FLOODING EVENTS
RADIO TOWER
NICHOLS ST
KY-40
KY-3
N
NEWBERRY LN
KY-8
COURT ST
CAIN PL
CANE ST
KY-40
WICKERFIELD RD
TURKEY CRK
CASSADY AVE
INEZ MIDDLE SCHOOL
MURRAY RD
VANCE HOLW
Martin Roads
Martin Streams
Flood Zones
A
AE
X
City of Inez
Martin County


CITY OF WARFIELD
FLOODING EVENTS
N
INEZ-WARFIELD RD
KY 2031
TIPPLE RD
FIREHOUSE LN
FLOYD ST
KY 40
COLLINS CRK
HOWELL ST
IRVING DR
TOM EVANS LN
KY 292
LOCUST CT
CAMP B RD
KY-1174
Warfield Repetitive Flooding Events
Martin Roads
Martin Streams
Flood Zones
A
AE
X
City of Warfield
Martin County


BIG SANDY REGIONAL
WATERSHEDS - HUC 8
N
Licking. Kentucky.
Big Sandy. Kentucky. West Virginia.
JOHNSON
MARTIN
MAGOFFIN
Upper Kentucky. Kentucky.
Tug. Kentucky. Virginia. West Virginia.
Lower Levisa. Kentucky.
FLOYD
PIKE
Upper Levisa. Kentucky. Virginia.
North Fork Kentucky. Kentucky.
Regional Watersheds - HUC 8
County Boundary
0 5 10 20 30 40
Miles

SEVERE REPETITIVE LOSS/REPETITIVE LOSS

Listed in the maps above are problem flooding areas along with the locations of repetitive loss and repetitive flooding areas throughout the region. Removal of the severe repetitive loss properties is a goal that each county in the region is working to accomplish.

The National Flood Insurance Reform Act of 2004 recognized repetitive loss as a significant problem and defined severe repetitive loss (SRL) as: "a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

The latest data from the Kentucky Hazard Mitigation Program shows 7 repetitive loss properties in Pike County and 5 severe repetitive loss properties. The data also shows 1 repetitive loss property each in Floyd, Johnson and Martin Counties and 1 severe repetitive loss property in Johnson and Floyd County. The counties are working to address the problems with the properties.

FLOODING EVENTS[5]

[6]Floyd County

	Events	Property Damage	Crop Damage	Disaster Declaration
2000	6	$16,000	$0	
2001	4	$7,655,000	$0	DR-1388
2002	4	$755,000	$250,000	DR-1414
2003	4	$1,200,000	$0	DR-1475
2004	12	$7,000,000	$0	DR-1523
2005	2	$0	$0	
2006	0	$0	$0	
2007	9	$200,000	$0	DR-1703
2008	0	$0	$0	
2009	16	$76,000	$0	DR-1841,DR-1818
2010	5	$0	$0	
2011	3	$25,000	$0	
2012	1	$1,000	$0	
2013	22	$49,000	$5,000	
2014	8	$1,014,000	$1,000	DR-4196
Totals	[7]97	$18,000,000	$256,000	8 declared disasters.

Pike County

Year	Events	Property Damage	Crop Damage	Deaths	Disaster Declaration
2000	14	$501,000	$0	0	
2001	7	$6,035,000	$0	2	DR-1388
2002	11	$5,032,000	$250,000	1	DR-1414
2003	6	$6,110,000	$0	0	DR-1475
2004	8	$3,000,000	$0	0	DR-1523
2005	2	$11,000	$0	0	
2006	1	$0	$0	0	DR-1703
2007	4	$327,000	$0	0	

[5] "Flooding events" are being defined as incidents of reported flooding. A single storm typically results in multiple flooding events across each county.
[6] Floyd County has only reported a single injury due to flooding since 2000.
[7] Of the 97 flooding events in Floyd County 73% (71/97) of them were due to flash flooding.

2008	1	$7,000	$0	0	
2009	23	$218,000	$0	0	DR-1841,DR-1818,DR-1925
2010	13	$63,000	$0	1	
2011	5	$0	$0	0	
2012	7	$7,000	$0	0	
2013	9	$19,000	$6,000	0	
2014	2	$101,000	$0	0	DR-4196
Totals	[8]114	$21,424,000	$256,000	4	9 declared disasters.

Johnson County

Year	Events	Property Damage	Crop Damage	Disaster Declaration
2000	4	$9,000	$0	
2001	0	$0	$0	
2002	2	$50,000	$0	
2003	7	$597,000	$0	
2004	9	$4,002,000	$0	DR-1523
2005	2	$0	$0	
2006	1	$0	$0	
2007	0	$0	$0	
2008	0	$0	$0	
2009	0	$0	$0	
2010	2	$0	$0	
2011	5	$5,000	$0	
2012	1	$0	$0	
2013	4	$2000	$3,000	
2014	12	$3,020,000	$7,000	DR-4196
Totals	[9]49	$7,685,000	$10,000	2 declared disasters.

Magoffin County

Year	Events	Property Damage	Crop Damage	Disaster Declaration
2000	2	$0	$0	
2001	1	$0	$0	
2002	2	$0	$0	
2003	7	$855,000	$0	DR-1475
2004	8	$4,500,000	$0	DR-1523
2005	3	$0	$0	
2006	0	$0	$0	
2007	0	$0	$0	
2008	0	$0	$0	
2009	3	$0	$0	DR-1818, DR-1841
2010	3	$0	$0	
2011	0	$0	$0	
2012	0	$0	$0	
2013	5	$3,000	$2,000	
2014	1	$1,000	$0	
Totals	[10]35	$5,358,000	$2,000	4 declared disasters.

Martin County

Year	Events	Property Damage	Crop Damage	Disaster Declaration
2000	2	$100,000	$0	

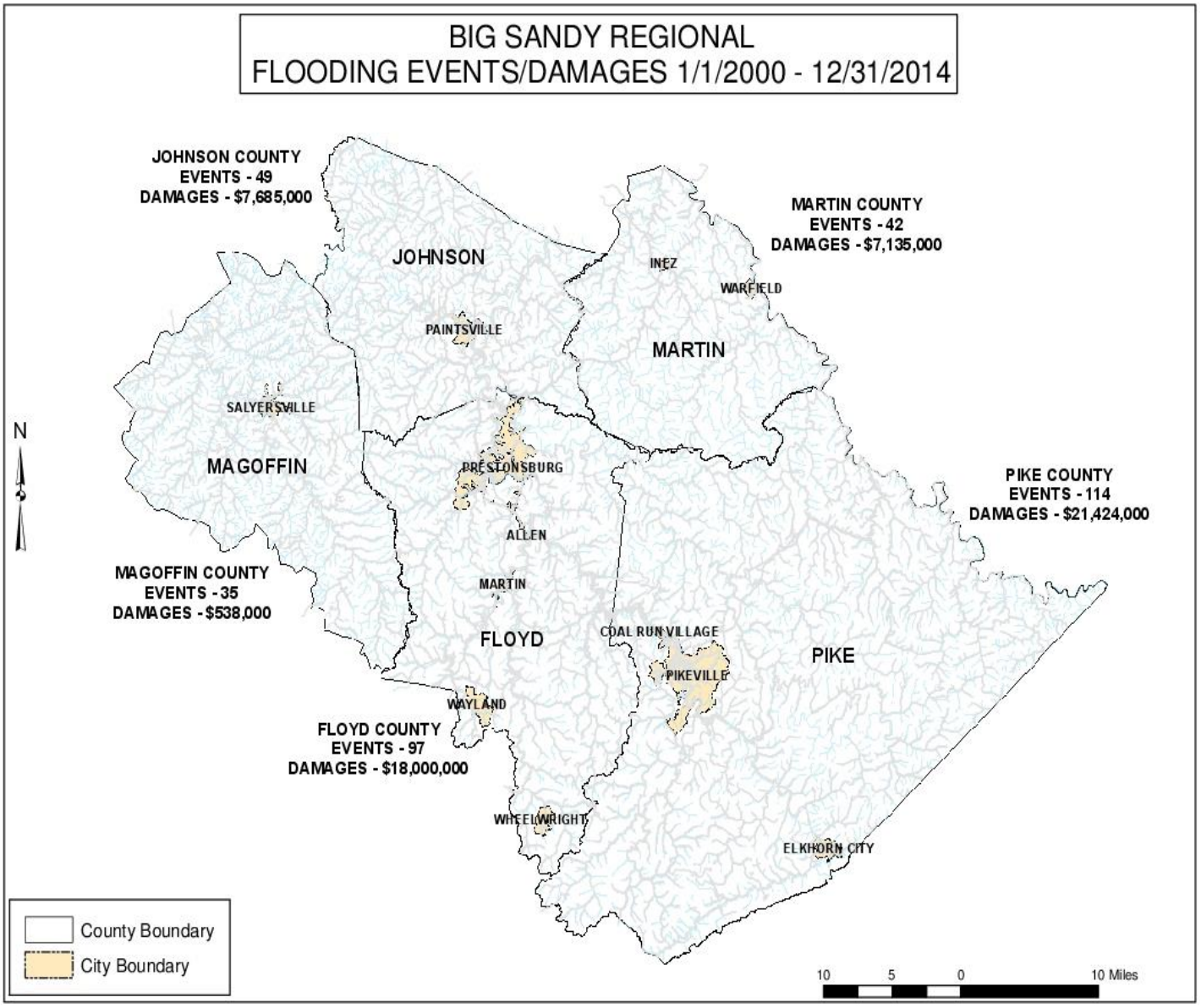
[8] Of the 114 flooding events in Pike County 75% (86/114) of them were due to flash flooding.
[9] Of the 49 flooding events in Johnson County 76% (37/49) of them were due to flash flooding.
[10] Of the 35 flooding events in Magoffin County 63% (22/35) of them were due to flash flooding.

2001	0	$0	$0	
2002	2	$10,000	$10,000	DR-1414
2003	7	$15,000	$0	
2004	9	$7,000,000	$0	DR-1523
2005	3	$5,000	$0	
2006	0	$0	$0	
2007	2	$0	$0	DR-1703
2008	0	$0	$0	
2009	0	$0	$0	DR-1818
2010	3	$0	$0	
2011	4	$0	$0	DR-1976
2012	2	$0	$0	DR-4057
2013	4	$2,000	$1,000	
2014	4	$3,000	$1,000	
Totals	[11]42	$7,135,000	$12,000	6 declared disasters.

REGIONAL FLOODING SUMMARY

- 337 Reported Flooding Events.
- $59,602,000 in property damages.
- $536,000 in crop damages.
- 1 reported injury and 4 deaths.

[11] Of the 42 flooding events in Martin County 52% (22/42) of them were due to flash flooding.



HISTORY OF FLOODING IN THE BIG SANDY REGION

Flooding and flash flooding events have historically impacted the Big Sandy Region in a very significant way. Throughout recorded history for the region there are numerous examples dating back as far as 150 years that illustrates the impact flooding has had on the region. As far back as 1862 the annals of history tell us that the inhabitants of the Big Sandy Region dealt with major flooding in the area. The history books show us that there were around 12 major floods between 1862 and 1963. Those floods occurred in February of 1862, March of 1899, June of 1901, April 1908, March 1913, January 1918, March 1929, January 1937, February 1939, February 1955, January 1957, March of 1963, April 1977, and May of 1984.

The impact flooding has had on the Big Sandy Region over the last 24 years is no different than the previous 125. According to NOAA and using federally declared disasters, major flooding both in the form of flooding and flash flooding have greatly impacted the region over the last 24 years. Since 1990 alone the region has seen 4 deaths and 3 injuries to flooding and has seen nearly $63 million dollars in damages occur to flooding alone.

On the night of 8/03/2001 in Floyd County, high water from the areas worst flash flooding in years took its toll on area roads, bridges and homes. Extensive damage resulted in the county, making it one of five in the area to be classified as a presidentially declared disaster area. Up to 1200 homes were affected by the flash flood. All of the Left Beaver and Mud Creek area from Martin south to the end of the county was the hardest hit. Most of the southern part of the county was

without commercial utilities for several days after the flash flood. Several shelters were opened and more than 50 people stayed at the Mud Creek Senior Center, more were housed at Allen Central High School and other locations. Officials reported that Kentucky Highway 979 suffered severe damage. A 2 mile stretch of road along Mud Creek was completely washed out; there was no evidence of the road after waters receded. Road and bridge damage was too numerous to mention individually. Two months after the event several roads were still under repair. The 2 mile stretch along Mud Creek was still not repaired and residents were using the creek bed as a road to reach their residences.

The same night on 8/3/2001 in Pike County widespread flash flooding occurred across the area prompting the county to be a presidentially declared disaster area as well. Up to 5 inches fell in less than 3 hours on already saturated ground. Massive road and bridge damage resulted. Over 200 homes were affected by flooding with 5 homes being totally destroyed. Two people lost their lives in this event. Most of the damage occurred on county roads and bridges were $5.5 million dollars in damages resulted. Close to $500,000 in damages resulted in loses to homes in the county.

On 05/02-03/2002 Heavy rains fell across the Big Sandy and Kentucky River basins which resulted in excessive runoff and flooding in four eastern Kentucky counties. At 11 p.m. on May 2, in Pike County, a 24 year old man from Freeburn, KY was swept away in river flood water after his vehicle was stranded in the Tug Fork of the Big Sandy River at the Vulcan Bridge area on Kentucky Highway 194. At 5 a.m. EDT on May 3, the North Fork of the Kentucky River at Booneville, KY in Owsley County went above flood stage of 27 feet, and continued above flood stage until 1 p.m. on May 3, with a crest of 27.75 feet.

At approximately 6:30 a.m. on May 3, reports from Martin County told of water backed up from the Tug Fork of the Big Sandy River into Emily Creek and caused three feet of water to inundate Kentucky Highway 292 at Hode, KY. Deep water also occurred over Kentucky Highway 1714 on Wolf Creek Road. Seven to eight feet of water covered Mount Sterling Branch and Long Branch. Three to four feet of water covered Kentucky Highway 400 on Tipple Road, about 3 miles west of Warfield Road. Throughout Floyd County, numerous roads and culverts were damaged on May 3 from rising water from the heavy rains which occurred on May 2. Also, numerous trees were swept away in mud slides. There was one report of a mud slide which swept trees onto a trailer and caused damage and one mud slide caused damage to a business**.**

On the afternoon of 5/30/04, a warm front was draped across eastern Kentucky. With extremely moist and unstable air, this boundary helped spark the beginning of a most unusual event for eastern Kentucky, and for that matter, for the country. Countless supercell thunderstorms developed along this boundary for hours on end, causing widespread tree damage and damage to structures. Flash flooding was also occurring with these storms which contained torrential rain. Unfortunately for eastern Kentucky, this was not the end to the severe weather or the flooding. Later in the night, mostly in the early hours of May 31st, a potent cold front burst through, bringing destruction to most if not all eastern Kentucky counties. Also, so much rain had fallen from the previous afternoon and evening, coupled with more heavy rain during the morning of May 31st, that widespread aerial flooding occurred. For some counties, the aerial flooding lasted for days. The cost of these storms totaled $12 million in Johnson, Martin and Floyd County alone.

On 8/22/14 significant flash flooding developed across portions of eastern Kentucky during the late afternoon and evening hours and into the early morning hours of August 23rd. Clusters of slow moving thunderstorms moved repeatedly across the areas of Johnson, Floyd, Pike, and Martin counties. The most widespread and devastating flooding, however, occurred across portions of Johnson, Floyd, and Pike counties. Floyd County was hit the hardest, particularly in a small section of north central Floyd where around 4 inches of rain fell in less than two hours. The flooding washed out roads in Estill, Floyd, and Johnson counties. At one point during the evening of August 22nd, numerous areas in and around Prestonsburg were completely under water with multiple cars and buildings surrounded by water at times. In general, 2 to 4 inches of rain fell in 90 minute to two hour period across Johnson, Floyd, and Pike counties, which lead to excessive runoff that quickly brought creeks and streams out of their banks and roadside culverts and storms drains to quickly overflow into adjacent roadways. The storms cost the region over $4 million dollars in damages.

FLOODING PROFILE SUMMARY

Information from the above data related to Flash Flooding and Flooding have been used to create maps that define the frequency of flood events and the impact of these events by county. Data on flood event magnitude was not available. The Regional Mitigation Committee has determined that the best way to define the impact of flooding events is based on damages from past flooding events. The probability of a future event has been determined based on the frequency of past events in the region. The following maps were created using the above data to summarize the jurisdictions with the greatest frequency and the greatest impact based on dollar losses. The limitation placed in using this data is that it is based on a county-by-county basis. Information for individual city jurisdictions is not available in this data. However, in future updates of this flood profile, we will attempt to obtain information regarding each jurisdiction and flood losses in hopes that it will be included.

SEVERE WINTER STORM (4.2.2)

A winter storm can range from moderate snow over a few hours to blizzard conditions with blinding wind-driven snow, sleet and/or ice that lasts several days. Some winter storms may be large enough to affect several states while others may affect only a single community. All winter storms are accompanied by low temperatures and blowing snow, which can severely reduce visibility. A severe winter storm is defined as an event that drops four or more inches of snow during a 12 –hour period or 6 or more inches during a 24 hour span. All winter storms make driving and walking extremely hazardous. The aftermath of a winter storm can impact a community or region for days, weeks, or months.

Blizzards are by far the most dangerous of all winter storms. They are characterized by temperatures below twenty degrees Fahrenheit and winds of at least 35 miles per hour. In addition to the temperatures and winds, a blizzard must have a sufficient amount of falling or blowing snow. The snow must reduce visibility to one-quarter mile or less for at least three hours (6). With high winds and heavy snow, these severe storms can punish residents throughout much of the United States during the winter months each year.

An ice storm occurs when freezing rain falls from clouds and freezes immediately on impact. Ice storms occur when cold air at the surface is overridden by warm, moist air at higher altitudes. As the warm air advances and is lifted over the cold air, precipitation begins falling as rain at high altitudes then becomes super cooled as it passes through the cold air mass below, and, in turn, freezes upon contact with chilled surfaces at temperatures of 32º F or below. In extreme cases, ice may accumulate inches thick, though just a thin coating is often enough to do severe damage. The weight of ice can cause the loss of trees, power lines, and even structures.

The Big Sandy Region is highly susceptible for winter storm occurrences; the geographically location and conditions that make the regional susceptible to severe thunderstorms, tornadoes, and flooding also provides suitable conditions for winter storm occurrences. The Big Sandy Region also serves as convergence zone for cold air mass fronts approaching from the north and warm moisture fronts approaching from the Gulf of Mexico. During winter storm occurrences the Big Sandy Region can experience heavy snow, freezing rain/ice, and heavy rainfalls dependent on fluctuating temperatures associated with the moderate climatic conditions of the region.

Three major winter storm events have occurred in the BSADD region over the last 40 years. The blizzard of 1978, the so called “Storm of the Century” blizzard of 1993, and the ice storm of 2003. The blizzard of 1993 was responsible for 270 deaths and over $1billion of damage throughout the Eastern United States. During the ice storm of 2003, one to two inches of ice accumulated on trees and power lines causing many to fall. The fallen trees blocked roads and knocked out electricity and phone service. First-hand accounts of this storm from mitigation planning committee members describe chain saw crews cutting their way into help stranded people as trees fell along the road behind them forcing them to cut their way back out again.

The following National Climatic Data Center tables detail the recent history of winter storms in the BSADD region. The following tables illustrate the history of winter storms at the county level, the severity in terms of deaths and injuries, and frequency and impact of winter storms in the BSADD region.

[12]WINTER STORM EVENTS

*Winter Storm Event is being considered as an actual winter storm, an ice storm or heavy snow.
**According to NOAA in the previous 15 years there have been no reported deaths or injuries due to any type of winter storm.

The following data is from 01/01/2000 to 12/31/2014.

	[13]Floyd County		Pike County			Johnson County	
Year	Events		Events	Property Damage		Events	Property Damage
2000	2		2	$0		1	$0
2001	0		1	$0		1	$0
2002	4		4	$0		4	$3,200
2003	1		3	$0		1	$0
2004	3		2	$0		2	$0
2005	1		1	$0		1	$0

[12] A1ll data taken from www.ncdc.noaa.gov
[13] Floyd County reported no property damage as a result of a winter storm since 2000.

2006	0		0	$0		0	$0
2007	0		0	$0		1	$0
2008	1		2	$0		1	$0
2009	9		9	$100,000		4	$0
2010	10		11	$0		7	$0
2011	0		1	$0		0	$0
2012	2		5	$20,000		1	$0
2013	1		2	$0		0	$0
2014	3		3	$0		4	$0
Totals	37		46	$120,000		28	$3,200

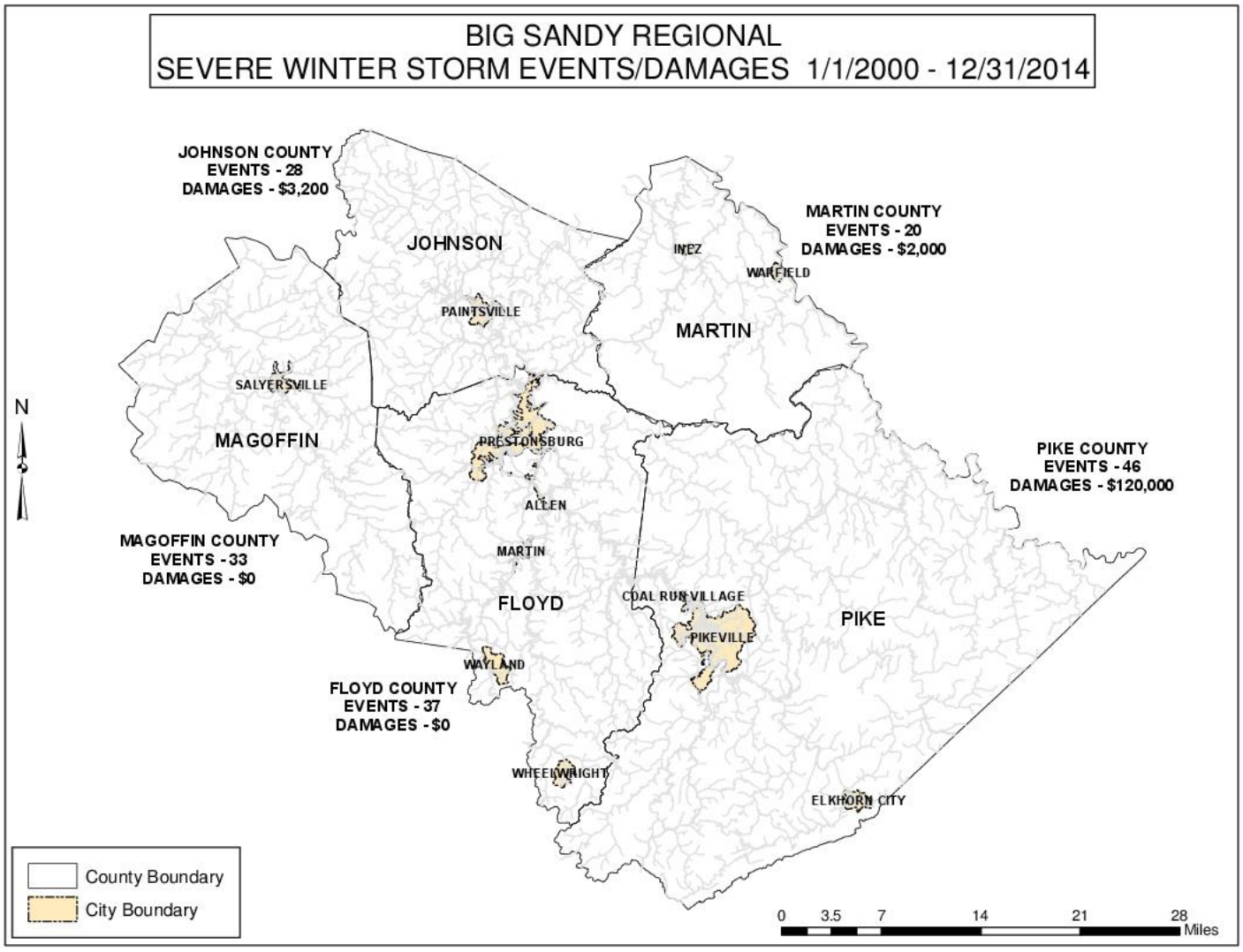
[14]Magoffin County **Martin County**

Year	Events		Events	Property Damage
2000	1		1	$0
2001	2		0	$0
2002	4		1	$2,000
2003	3		1	$0
2004	2		1	$0
2005	0		0	$0
2006	1		0	$0
2007	1		1	$0
2008	2		1	$0
2009	4		4	$0
2010	6		3	$0
2011	0		0	$0
2012	4		1	$0
2013	0		0	$0
2014	3		3	$0
Totals	33		20	$2,000

REGIONAL WINTER STORM EVENT TOTALS

164 total winter storm events.
$125,200 in property damage.

[14] Magoffin County reported no property damage as a result of a winter storm since 2000.



WINTER STORM PROFILE SUMMARY:

The location and extent of severe winter storms are not limited by geographic boundaries and impact all five counties and twelve cities within the district. Each county can anticipate at least one winter storm per year. Winter storm impacts have historically caused damage to power-lines and loss of electrical power, as well as loss of accessibility due to impassable roadways. The loss of power and inability of residents to travel the rural county routes lead to exposure of persons to potential dangers of death by exposure, or by carbon monoxide due to secondary heating sources from combustion fuels (i.e. kerosene, wood, or propane/natural gas). The direct costs of loss from power line damage and repair have been unavailable from the local power companies, but would be very useful in future updates. If funds are available this information could be collected and incorporated into loss estimates and potential damage for the five-year update. In future updates additional information needs to be collected as to more detailed damage in terms of local loss as well as in terms of loss of transportation ability and access to services. Population vulnerability is also a major factor in winter snow and ice storms. The aged population and handicapped population are overall much more vulnerable than the general population due to their inability to physically cope with the loss of heat sources and lack of transportation during severe winter storms.

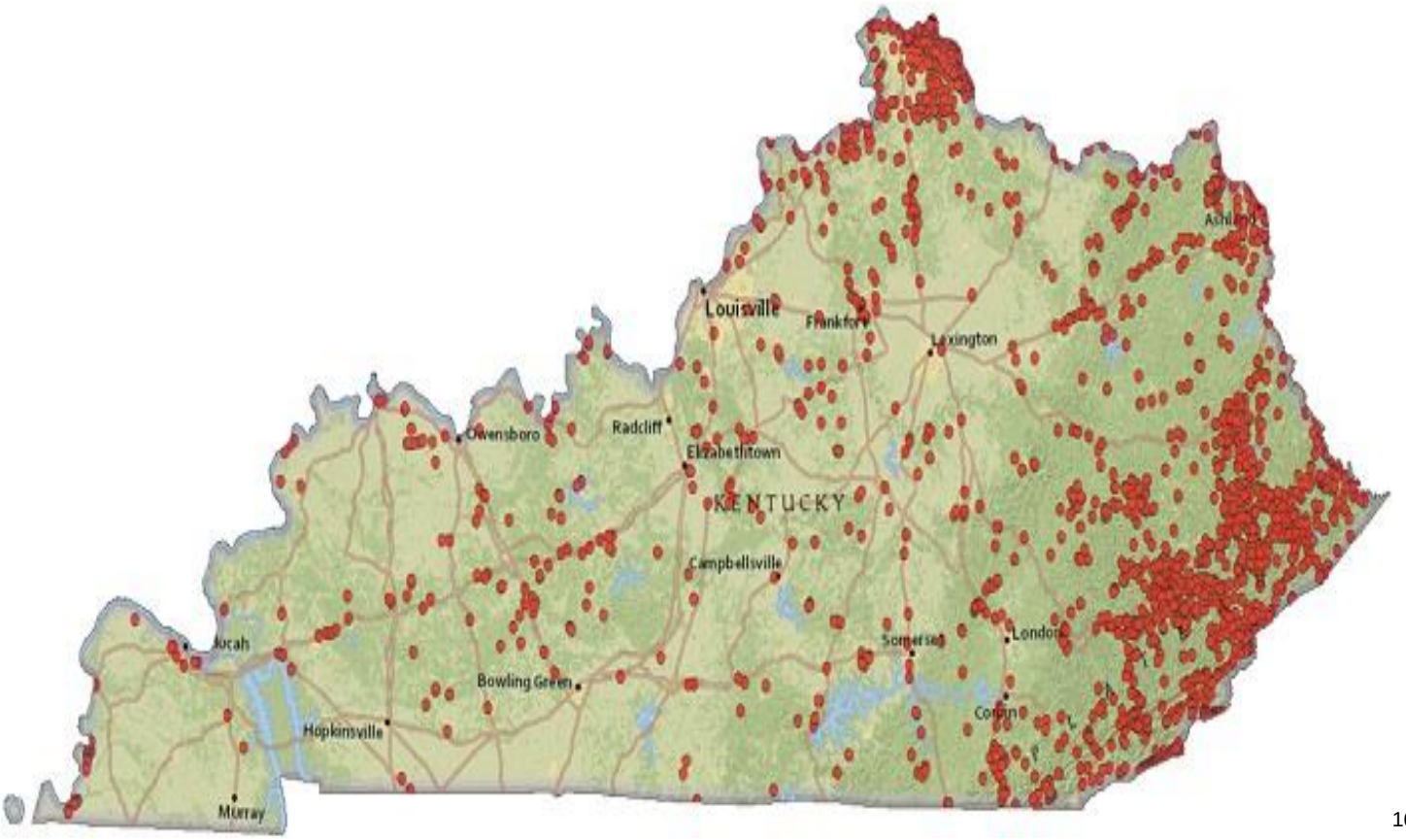
LANDSLIDES (4.2.3)

A landslide is the movement of a mass of earth or rock from a higher elevation to a lower level under the influence of gravity. There are two categories of landslides: (1) slope failures such as rockslides, rock falls and slump, and (2) sediment flows such as earthflows, mudflows, and debris flows.

Several natural and human factors may contribute to or influence landslides. The three principal natural factors are topography, geology, and precipitation. The principal human activities are cut-and-fill construction for highways, construction of buildings and railroads, and mining operations. Landslides are often correlated with other natural hazards. For instance, flooding may trigger land sliding because both involve heavy precipitation, runoff, and ground saturation.

Landslides are a common problem throughout the Appalachian region, the BSADD region included. According to USGS landslide hazard data, most of the BSADD region is at high risk to landslides. The map below was compiled by the University of Kentucky's, Geological Survey Department and illustrates known, documented landslides across the state. The map illustrates just how susceptible Eastern Kentucky has been and continues to be to landslides.

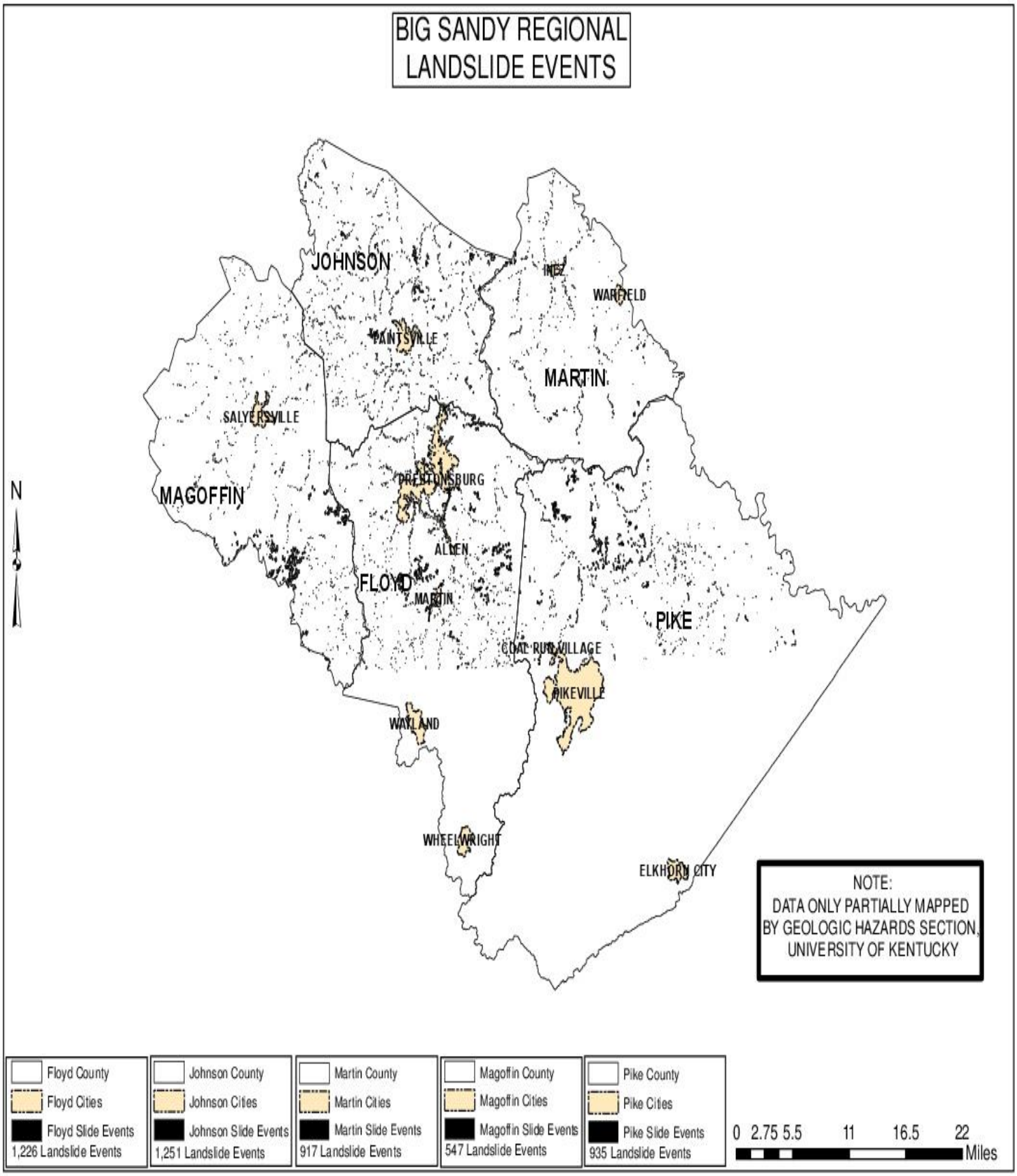
Reported Landslides[15]

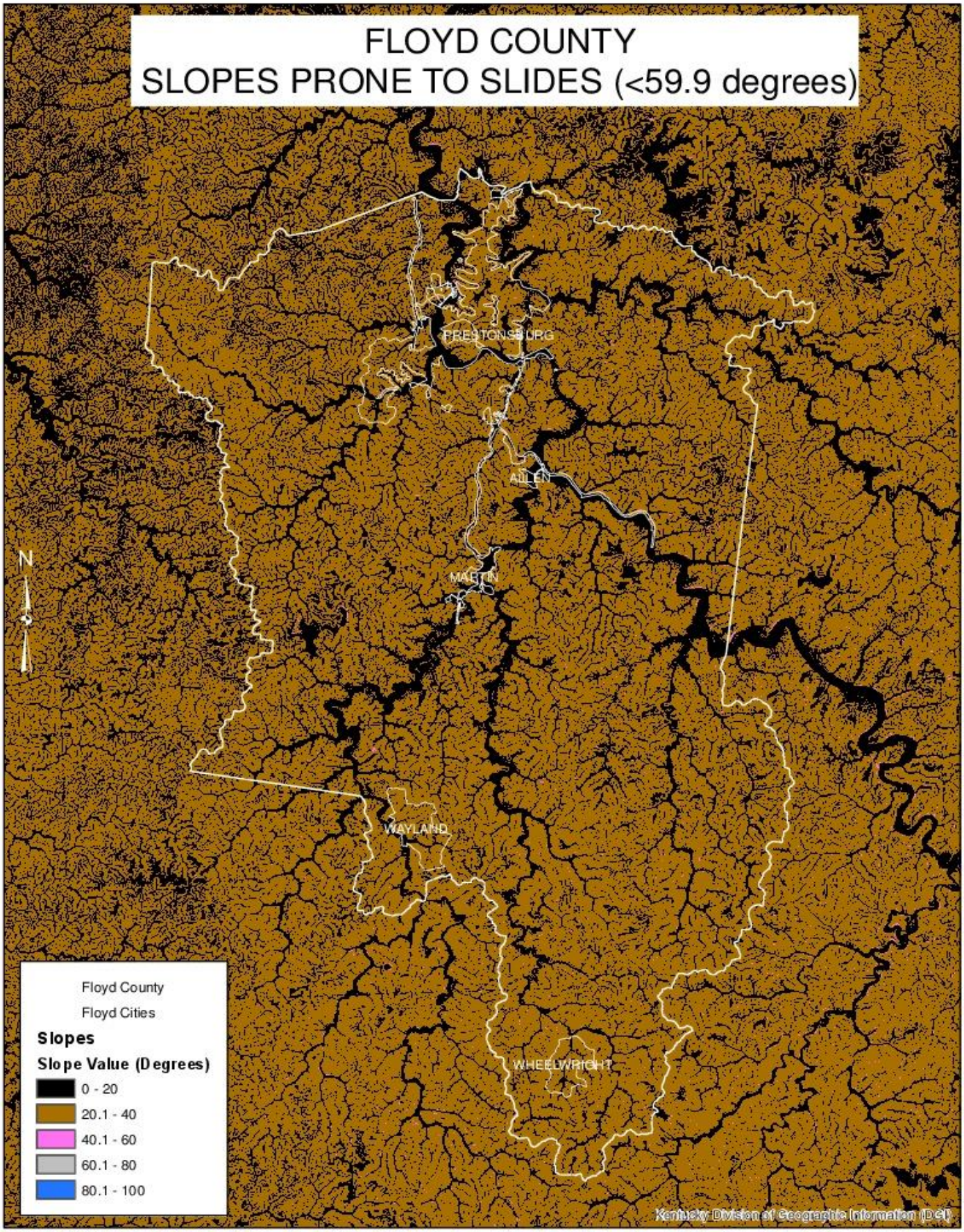


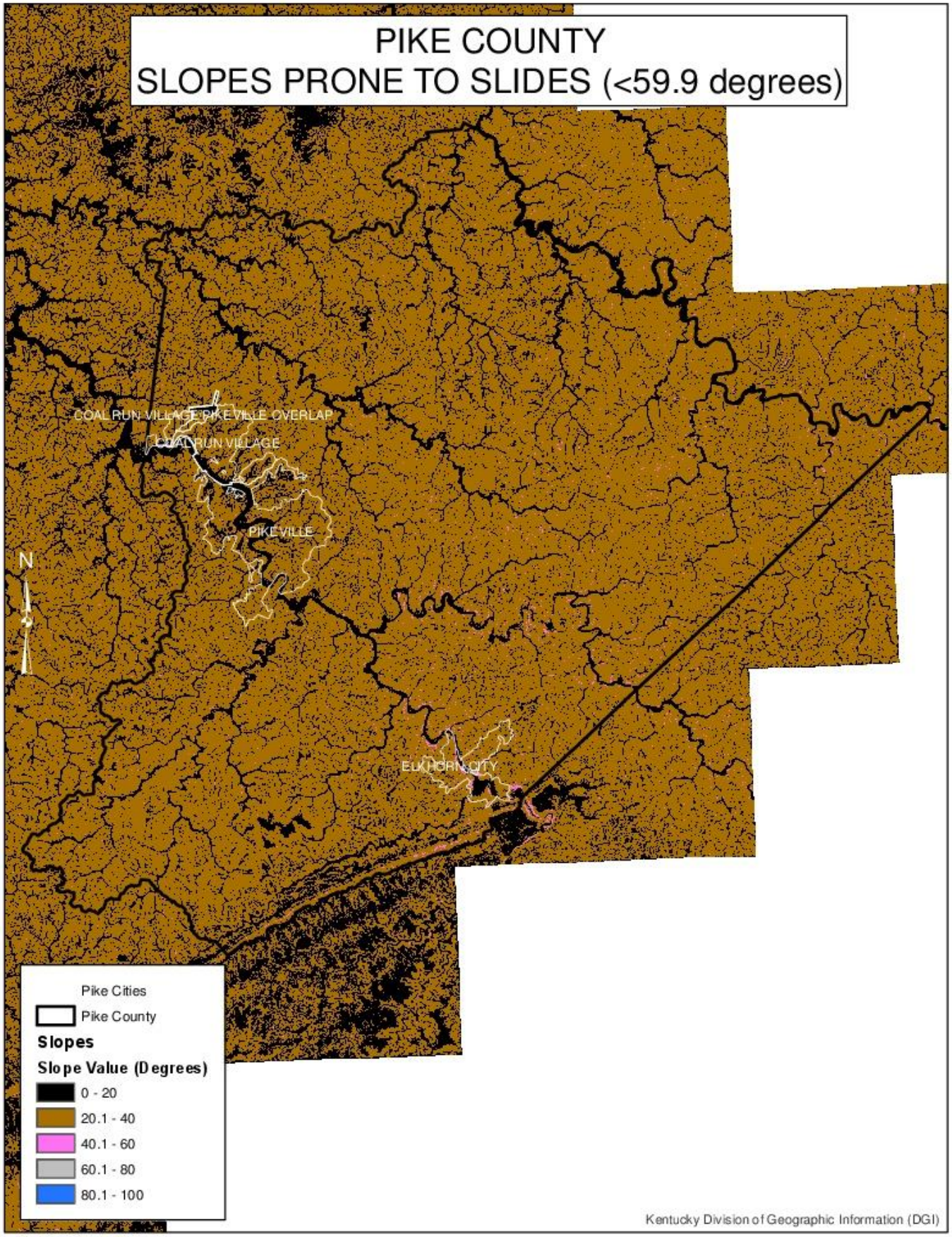
[16]

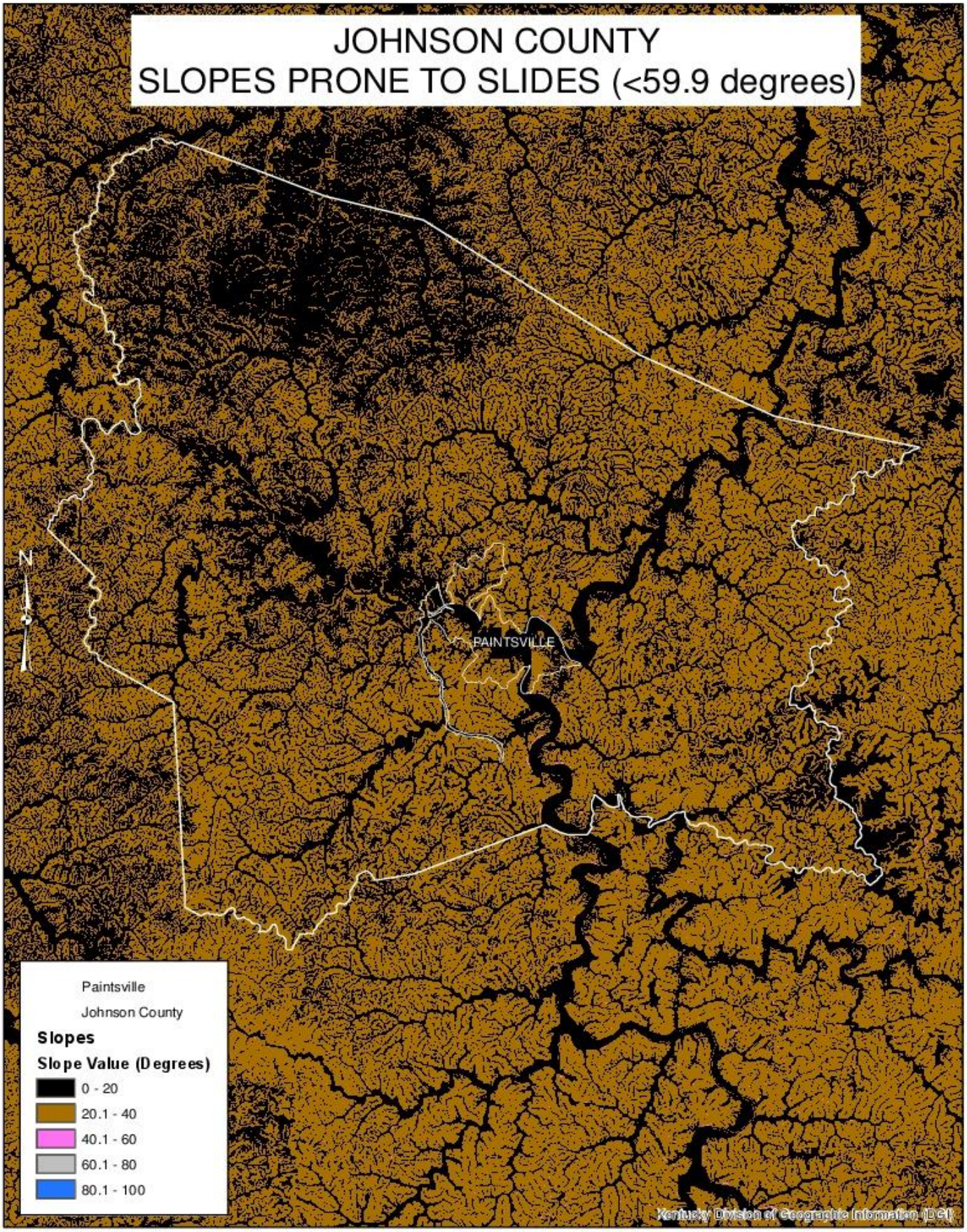
[15] Reported landslides for pages 44 and 45 derive from the Kentucky Geological Survey (KGS) Landslide Inventory. Events occurred over a 41-year span: 1973-2014.

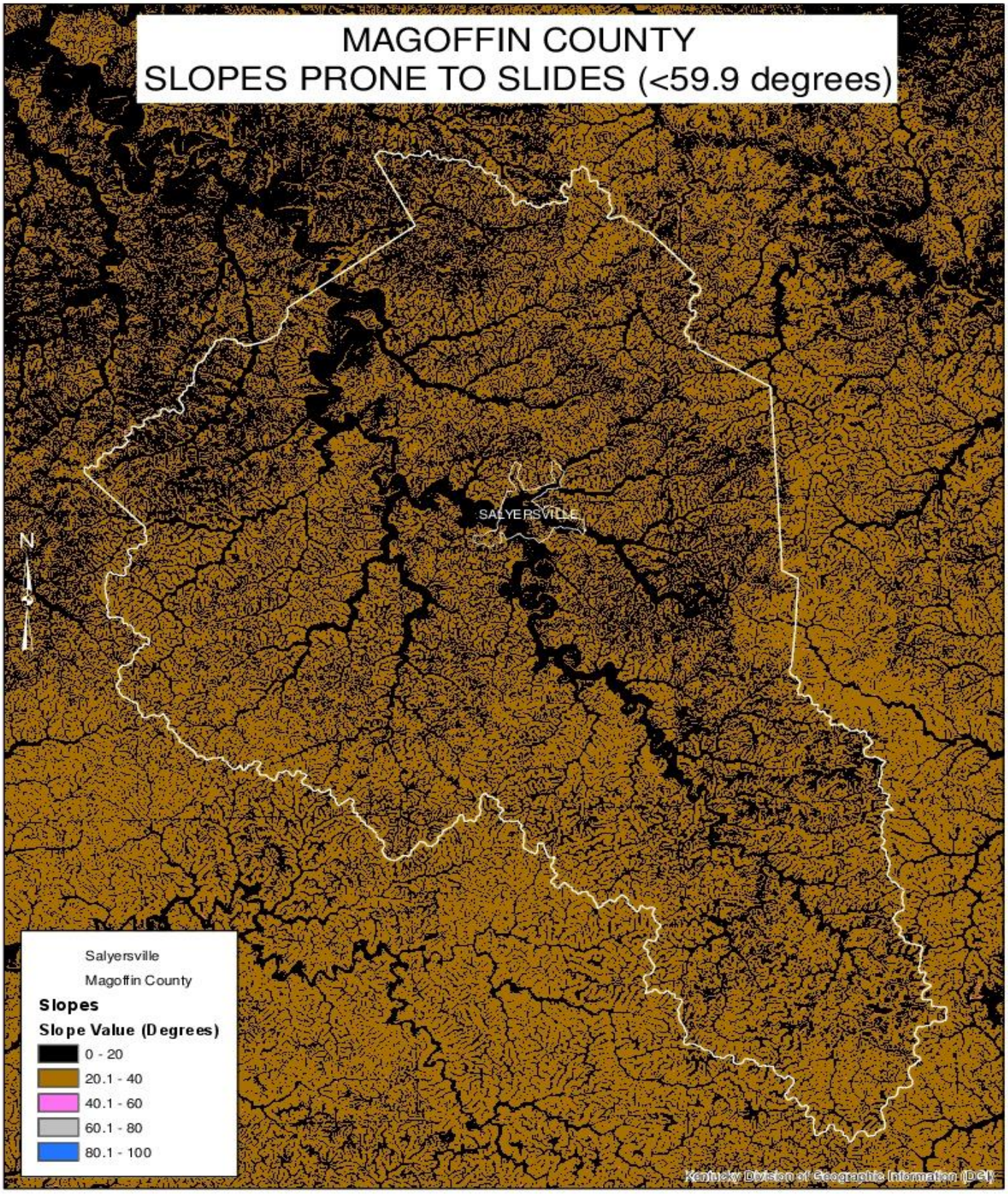
[16] https://www.uky.edu/KGS/geologichazards/landslide.htm

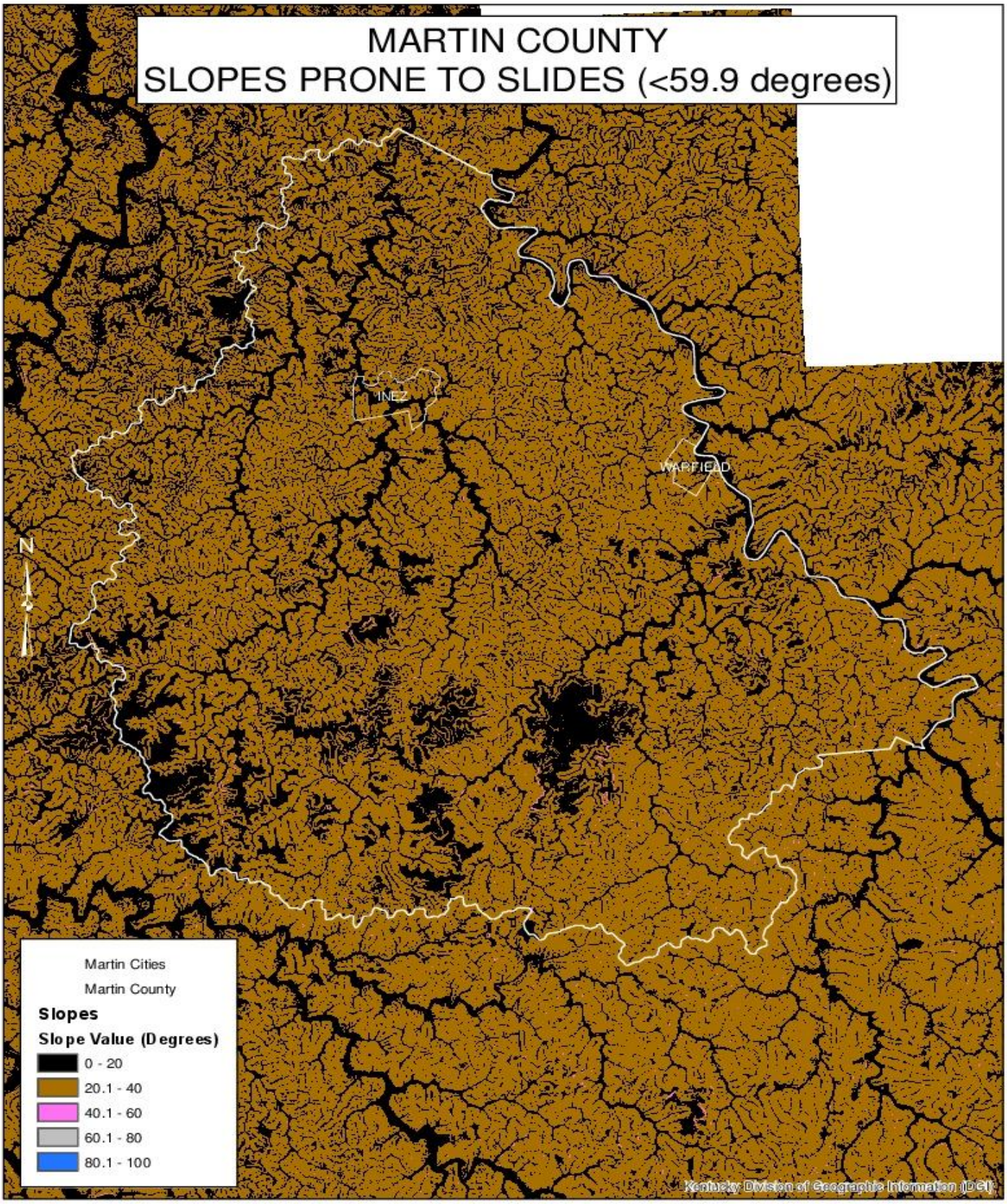

BIG SANDY REGIONAL
LANDSLIDE EVENTS
JOHNSON
INEZ
WARFIELD
PAINTSVILLE
MARTIN
SALYERSVILLE
PRESTONSBURG
MAGOFFIN
ALLEN
FLOYD
MARTIN
PIKE
COAL RUN VILLAGE
PIKEVILLE
WAYLAND
WHEELWRIGHT
ELKHORN CITY
N
NOTE:
DATA ONLY PARTIALLY MAPPED
BY GEOLOGIC HAZARDS SECTION,
UNIVERSITY OF KENTUCKY
Floyd County
Floyd Cities
Floyd Slide Events
1,226 Landslide Events
Johnson County
Johnson Cities
Johnson Slide Events
1,251 Landslide Events
Martin County
Martin Cities
Martin Slide Events
917 Landslide Events
Magoffin County
Magoffin Cities
Magoffin Slide Events
547 Landslide Events
Pike County
Pike Cities
Pike Slide Events
935 Landslide Events
0 2.75 5.5 11 16.5 22
Miles


FLOYD COUNTY
SLOPES PRONE TO SLIDES (<59.9 degrees)
PRESTONSBURG
ALLEN
MARTIN
WAYLAND
WHEELWRIGHT
N
Floyd County
Floyd Cities
Slopes
Slope Value (Degrees)
0 - 20
20.1 - 40
40.1 - 60
60.1 - 80
80.1 - 100
Kentucky Division of Geographic Information (DGI)


PIKE COUNTY
SLOPES PRONE TO SLIDES (<59.9 degrees)
COAL RUN VILLAGE-PIKEVILLE OVERLAP
COAL RUN VILLAGE
PIKEVILLE
N
EUKHORN CITY
Pike Cities
Pike County
Slopes
Slope Value (Degrees)
0 - 20
20.1 - 40
40.1 - 60
60.1 - 80
80.1 - 100
Kentucky Division of Geographic Information (DGI)


JOHNSON COUNTY
SLOPES PRONE TO SLIDES (<59.9 degrees)
N
PAINTSVILLE
Paintsville
Johnson County
Slopes
Slope Value (Degrees)
0 - 20
20.1 - 40
40.1 - 60
60.1 - 80
80.1 - 100
Kentucky Division of Geographic Information (DGI)


MAGOFFIN COUNTY
SLOPES PRONE TO SLIDES (<59.9 degrees)
SALYERSVILLE
N
Salyersville
Magoffin County
Slopes
Slope Value (Degrees)
0 - 20
20.1 - 40
40.1 - 60
60.1 - 80
80.1 - 100
Kentucky Division of Geographic Information (DGI)


MARTIN COUNTY
SLOPES PRONE TO SLIDES (<59.9 degrees)
INEZ
WARFIELD
N
Martin Cities
Martin County
Slopes
Slope Value (Degrees)
0 - 20
20.1 - 40
40.1 - 60
60.1 - 80
80.1 - 100
Kentucky Division of Geographic Information (DGI)

LANDSLIDE PROBLEM AREAS

FLOYD COUNTY

Floyd County is currently in the process of monitoring and mapping their landslide locations and adding specific GPS points to better track the locations. The following is a list of locations they are currently monitoring:

1) 37°40'49.8"N 82°47'21.2"W
2) 37°40'23.8"N 82°45'13.4"W
3) Along KY 321 between Left Fork of Spradlin Branch and Bays Branch Road.

PIKE COUNTY

Pike County is currently in the process of monitoring and mapping their landslide locations and adding specific GPS points to better track the locations. The following is a list of locations they are currently monitoring:

1) 1018 Turkey Pen Rd
2) 2672 Greasy Crk
3) 1302 Shelby Dry Frk
4) Adkins Br, Hurricane Creek Pikeville
5) 81 Mud Lick Hardy
6) 205 Upper Blackberry Rd
7) Upper Pompey Rd. 12 homes in Buyout
8) Rocky CT. 6 Homes in Buyout

JOHNSON COUNTY

Johnson County is currently in the process of monitoring and mapping their landslide locations and adding specific GPS points to better track the locations. The following is a list of locations they are currently monitoring:

1) Carter Lane, Paintsville Ky.
2) RT .40 Woodland Estates
3) Off RT .23 at Middle Fork

MAGOFFIN COUNTY

Magoffin County is currently in the process of monitoring and mapping their landslide locations and adding specific GPS points to better track the locations. The following is a list of locations they are currently monitoring:

1) Jellico Road
2) Brushy Fork
3) Brushy Fork Loop
4) Big Lick branch
5) Little Pricey Branch
6) Painters Lick Road
7) Right Fork Puncheon

MARTIN COUNTY

Martin County is currently in the process of monitoring and mapping additional landslide locations and adding specific GPS points to better track the locations. The following are the two most critical locations they are currently monitoring:

1) 3752 Big Elk Road
2) 2208 Turkey Creek Road

LANDSLIDE PROFILE SUMMARY

From the above profile, a couple of conclusions should be obvious: 1) The five counties comprising the Big Sandy Area Development District region have suffered a high frequency of landslide events in the past and 2) the Big Sandy region is almost ubiquitously susceptible to landslides. Regarding the former, consider the per year average of *inventoried* landslide events for each of the Big Sandy region counties:

County	Inventoried Landslide	Per Year Average	Per Year Average Frequency

	Events from 1973-2014	Frequency (Rounded Up)	As Percentage of Days of Given Year
Floyd	1,226 Events	30 Events	8.22% Average Annual Probability
Johnson	1,251 Events	31 Events	8.49% Average Annual Probability
Magoffin	547 Events	14 Events	3.84% Average Annual Probability
Martin	917 Events	23 Events	6.30% Average Annual Probability
Pike	935 Events	23 Events	6.30% Average Annual Probability

Regarding the latter, this hazard mitigation plan update has defined systematically the vulnerability to and magnitude of landslide (i.e. extent or how bad a landslide can get) in terms of susceptibility and in relation to a scale comprised of upper bounds for the slope of a potential (susceptible) landslide site. However, there are other ways to illustrate the severity of landslides to the Big Sandy region: Data collection on landslides are notoriously devoid of systematic recording of historical damages. FEMA implicitly recognizes the nature of the impacts of landslides through its Benefit-Cost Analysis Toolkit methodology for landslide-targeted mitigation projects: To evidence cost-effectiveness of a potential landslide-targeted mitigation project, FEMA does not rely upon historical damages. Rather, it relies upon asset values near a susceptible site in order to calculate the benefits to mitigating the effects from landslides.

To illustrate impacts, then, this plan update relies upon total costs of existing and potential (i.e., seeking funding) FEMA-funded landslide-targeted mitigation projects within the counties comprising the Big Sandy region: FEMA has or is expected to determine the cost-effectiveness of these projects based upon asset values effected by the prone landslide. A total project cost of $100,000, for example, implies that the impacts from a landslide event to this or these site(s) are greater than $100,000 as this example would need to evidence that $100,000 cost (defined by asset values) would reap benefits in excess of $100,000.

Jurisdiction	Project Name	FEMA Funding Source	Project Cost-Cum-Impacts
Johnson County	Johnson County Landslide Acquisition	DR-4239	> $1,651,419
Johnson County (Paintsville)	Carter Lane Slide (Acquisition, Stabilization) Mitigation Project	DR-4218	> $2,578,275
Pike County (Phelps; Yorktown)	Upper Pompey Road Landslide Acquisition	DR-4217	> $2,668,300
Pike County (Phelps; Yorktown)	Rocky Court Landslide Acquisition	DR-4057	> $427,875
Pike County (Pikeville)	Peach Orchard Landslide Acquisition	DR-4008	> $104,960

Finally, to further illustrate extent of the landslide hazard for the Big Sandy region, briefly mentioning some of the context behind the second project on the above list is relevant:

Uniquely, the Carter Land Slide Mitigation Project was prefaced with a study conducted by the Kentucky Geological Survey (KGS). This study identified some measurement and context of the particular slide prompting the project application by which to grasp how bad a landslide can get for the Big Sandy counties: The homes impacted by the “Carter Lane” landslide were assets built on an old landslide that was reactivated in 2015. The landslide track length was approximately 360 feet long. (Width was not calculated.) The landslide deposits were derived from eroded hillslope colluvium and from a (southwest-facing) drainage that might have been the result of an old debris fan. The homes impacted by the landslide event actually suffered three landslides that were likely triggered by 7.5 inches of rain (in April 2015) naturally drained through a concave slope and that “percolated” through shales and clays (whose impermeability allows said “percolation” through the soils and concentration among surface layers). “The causes of the slide [were] a complex interaction between slope modification and physical properties of the rocks, soil, and slope morphology. The bedrock geology, clayey colluvium, steep slopes, slope development, and groundwater flow [were] cumulative causes that, when triggered...produce[d] slope failure…”

TORNADOES (4.2.4)

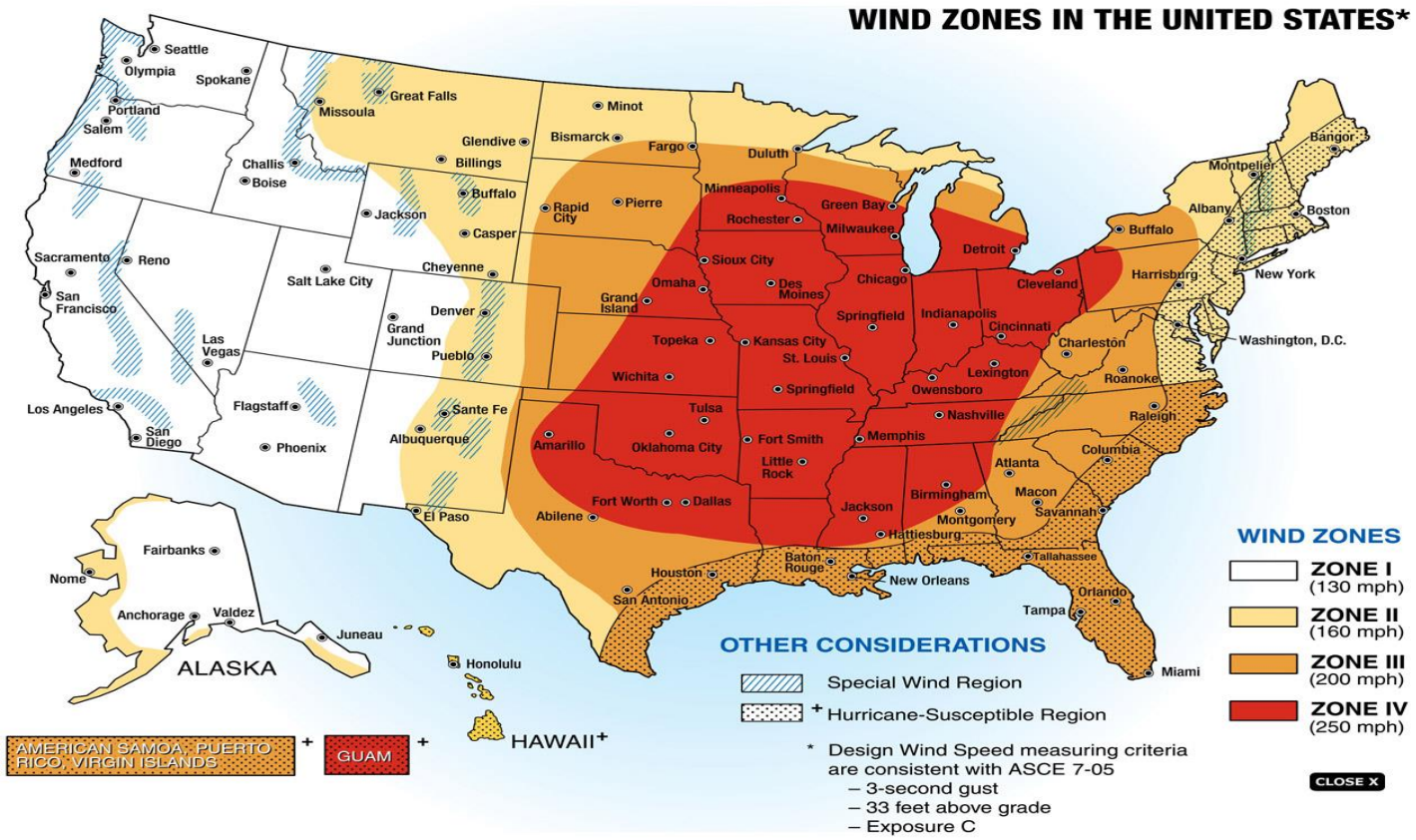
A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of 1 mile wide and 50 miles long. Tornadoes are among the most unpredictable of weather phenomena. While tornadoes can occur almost anywhere in the world, they are most prevalent in the United States. According to the National Weather Service, about 42 people are killed because of tornadoes each year. Tornadoes can occur in any state but are more frequent in the Midwest, Southeast, and Southwest. Tornado season runs ordinarily from March through August; however, tornadoes can strike at any time of the year if the essential conditions are present.

Thunderstorms and hurricanes spawn tornadoes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. The winds produced from hurricanes, earthquake-induced fires, and wildfires have also been known to pro-duce tornadoes. The frequency of tornadoes in the nation's midsection is the result of the recurrent collision of moist, warm air moving north from the Gulf of Mexico with colder fronts moving east from the Rocky Mountains.

THE FUJITA SCALE

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage Done
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forests uprooted
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 mph	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars & refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies

The data below reflects the impact tornados have had on the Big Sandy Region since 1950. Due to the infrequency of tornados in the region the Regional Mitigation Committee decided to analyze data as far back as 1950. This gives us over 6 decades of tornado history to analyze in order to prepare and mitigate any potential tornado events in the future. The structure of this section will also be displayed differently than the previous sections. In an effort to simply and conveniently display relevant data on each hazardous event there was a need to provide more relevant information on tornados, therefore the tables below illustrate the relevant data on each tornado event that has affected the Big Sandy Region since 1950.



[17]

Floyd County

Date	Magnitude	Deaths	Injuries	Property Damage
09/09/1970	F1	0	2	$25,000
04/04/2011	EF1	0	0	$10,000
Totals		0	2	$35,000

Pike County

Date	Magnitude	Deaths	Injuries	Property Damage
05/20/1998	F0	0	0	$5,000
10/07/2014	EF1	0	0	$0
Totals		0	0	$5,000

Johnson County

Date	Magnitude	Deaths	Injuries	Property Damage
06/02/1990	F1	0	0	$250,000
03/02/2012	EF1	0	0	$25,000
03/02/2012	EF3	2	7	$980,000
06/09/2013	EF0	0	0	$0
Totals		2	7	$1,255,000

Magoffin County

Date	Magnitude	Deaths	Injuries	Property Damage
07/08/2001	F0	0	0	$0
03/02/2012	EF3	0	30	$1,800,000
Totals		0	30	$1,800,000

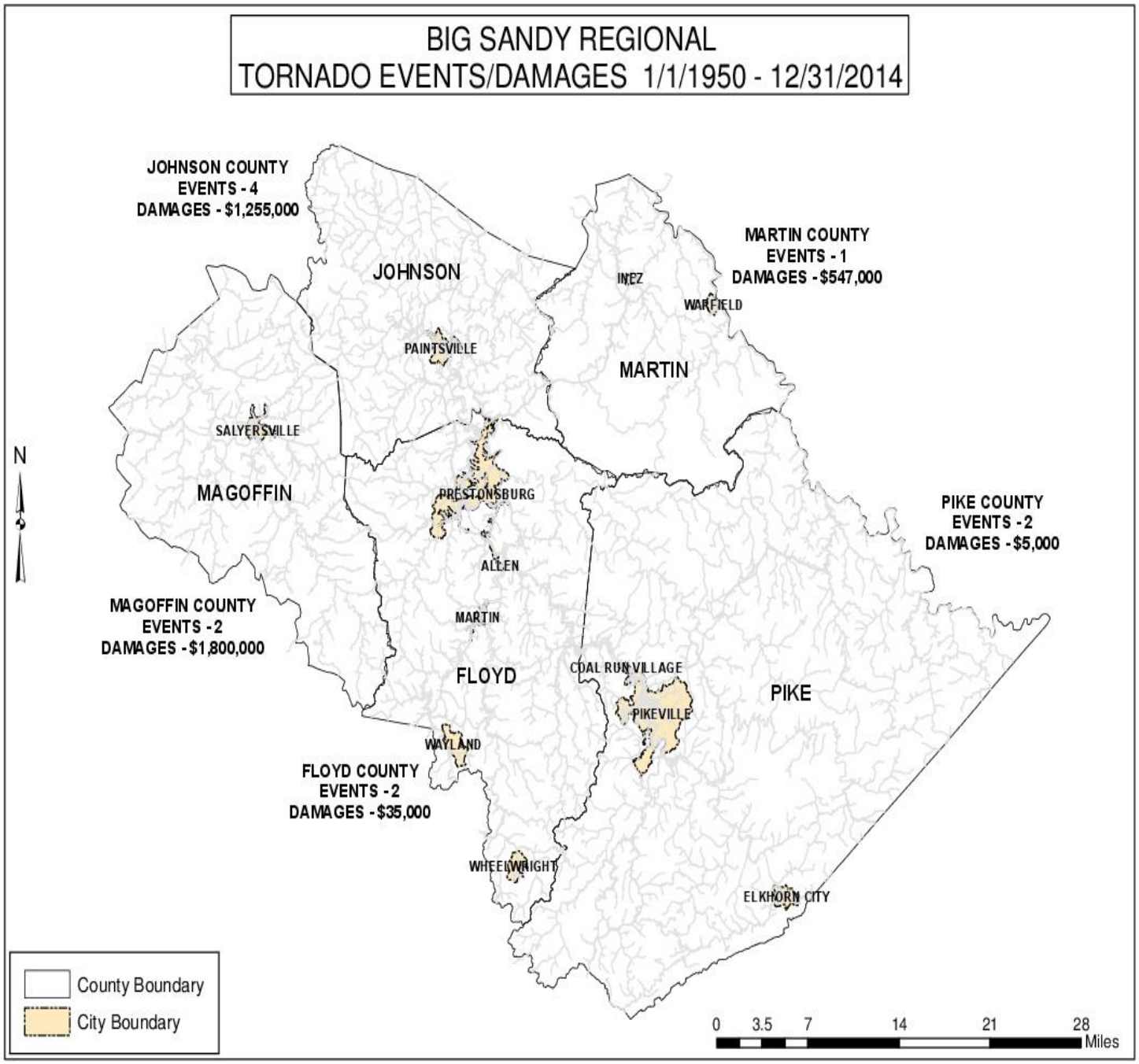
[17] Map taken from: Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business, December 2014 edition.

Martin County

Date	Magnitude	Deaths	Injuries	Property Damage
03/02/2012	EF2	0	0	$547,000
Totals		0	0	$547,000

REGIONAL TORNADO TOTALS

9 total tornado events.
$3,607,000 in property damage.



SUMMARY OF TORNADO PROFILE

Information from the above tables related to tornado events have been used to create maps that define the frequency of such events and the impact of these events on the BSADD region. The Regional Mitigation Committee has determined that the best way to define the impact of tornado events is based on damages sustained in past occurrences. The probability of

a future event has been determined based on the frequency of past events in the region. However this does not mean that the infrequency of historical occurrences would indicate that the region is not susceptible to tornados. All one has to do is look at the damage that occurred in this region on 03/02/2012 to illustrate this point. This is a region wide hazard that occurs randomly; therefore determining specific areas within a region that are more or less susceptible is not applicable.

The following maps were created using the above tables to summarize the jurisdictions with the greatest frequency and the greatest impact based on dollar losses. The limitation placed in using this data is that it is based on a county-by-county basis.

THUNDERSTORM/SEVERE WIND EVENTS (4.2.5)

Thunderstorms often produce extremely severe winds that may cause major damage. Although the intensity of the winds in thunderstorms is less than tornados, they cover a broader geographic area and can leave a much wider damage path. Thunderstorms also occur much more frequently than tornados. A thunderstorm is classified as **severe** when it contains one or more of the following phenomena: Hail 3/4" or greater, Winds gusting in excess of 50 knots (57.5 mph), or a tornado.
***Note: "Thunderstorm events" are defined as incidents of reported thunderstorm level winds. A single storm typically results in multiple reported events across each county.**

Floyd County

Year	Events	Property Damage
2000	2	$0
2001	4	$0
2002	1	$0
2003	2	$1,000
2004	6	$5,000
2005	4	$0
2006	7	$9,000
2007	6	$24,000
2008	22	$216,000
2009	14	$57,500
2010	2	$4,000
2011	7	$25,000
2012	12	$213,500
2013	4	$0
2014	12	$1,000
Totals	106	$498,500

[18]Pike County

Year	Events	Property Damage
2000	7	$0
2001	10	$45,000
2002	3	$15,000
2003	8	$45,000
2004	9	$52,000
2005	9	$1,000
2006	19	$34,000
2007	10	$92,500
2008	21	$117,000
2009	21	$162,000
2010	16	$74,000
2011	41	$195,000
2012	26	$189,000
2013	11	$0
2014	18	$0
Totals	229	$1,022,000

[19] Johnson County

Year	Events	Property Damage
2000	9	$10,000
2001	6	$0
2002	6	$6,000
2003	1	$0
2004	8	$15,000
2005	5	$3,000
2006	4	$0
2007	1	$30,000
2008	12	$244,000
2009	9	$112,000
2010	5	$35,000
2011	18	$89,000
2012	20	$53,000
2013	4	$0
2014	14	$0
Totals	122	$593,500

Magoffin County

Year	Events	Property Damage
2000	8	$0
2001	5	$2,000
2002	1	$5,000
2003	4	$7,000
2004	7	$32,000
2005	2	$0
2006	7	$0
2007	5	$32,500
2008	9	$82,000
2009	4	$22,000
2010	2	$10,000
2011	15	$52,000
2012	3	$0
2013	7	$10,000
2014	4	$0

Martin County

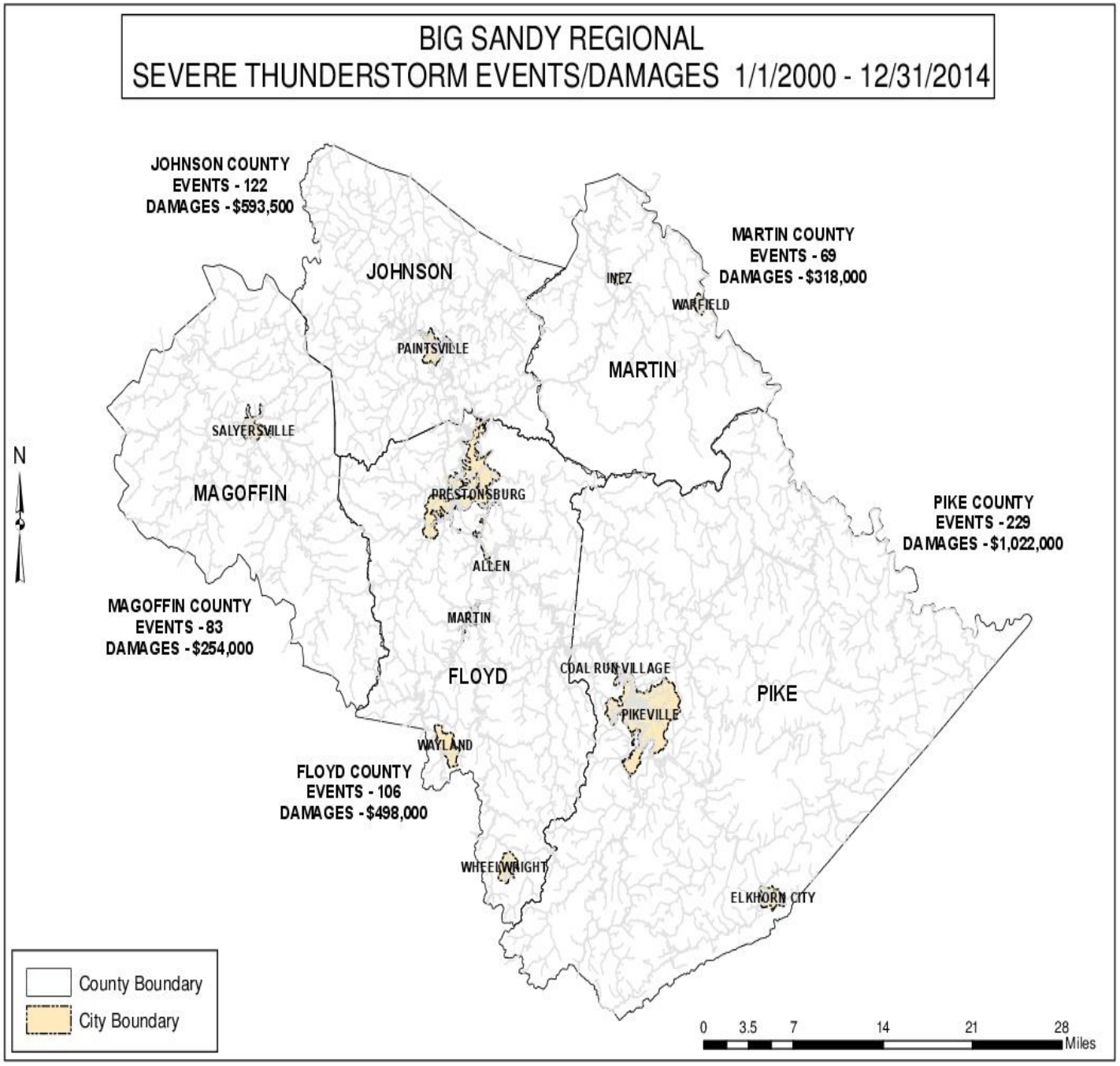
Year	Events	Property Damage
2000	3	$3,000
2001	4	$20,000
2002	1	$5,000
2003	6	$7,000
2004	3	$20,000
2005	2	$7,000
2006	2	$2,000
2007	4	$90,000
2008	8	$67,000
2009	3	$18,000
2010	4	$18,000
2011	7	$11,000
2012	5	$50,000
2013	3	$0
2014	14	$0

[18] Since 2000, there have been 3 reported injuries and 1 reported death due to thunderstorm events in Pike County.
[19] Since 2000, there has been 1 reported injury due to thunderstorm events in Johnson County.

Totals	83	$254,000		69	$318,000

REGIONAL THUNDERSTORM TOTALS

609 reported thunderstorm events. (About 41 per year as a region)
$2,686,000 in property damage.
1 death and 4 injuries as a result of thunderstorms.



SUMMARY OF THUNDERSTORM/SEVERE WIND PROFILE

Information from the above tables related to thunderstorm/severe wind events have been used to create maps that define the frequency of such events and the impact of these events on the BSADD region. The Regional Mitigation Committee has determined that the best way to define the impact of thunderstorm/severe wind events is based on damages sustained in past occurrences. As with tornados, thunderstorms occur throughout the region and therefore specific areas of susceptibility cannot be discerned. The probability of a future event has been determined based on the frequency of past events in the region. The following maps were created using the above tables to summarize the jurisdictions with the greatest frequency

and the greatest impact based on dollar losses. The limitation placed in using this data is that it is based on a county-by-county basis. Information for individual city jurisdictions is not available in this data.

WILDFIRE (4.2.6)

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed and spread quickly and are usually signaled by dense smoke that fills the area for miles around. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. An Urban-Wild-land Interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. Areas that have experienced prolonged droughts, or are excessively dry, are at risk of wildfires. People start more than four out of every five wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a factor, in that it expresses the pattern of vegetative growth and open areas. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires.

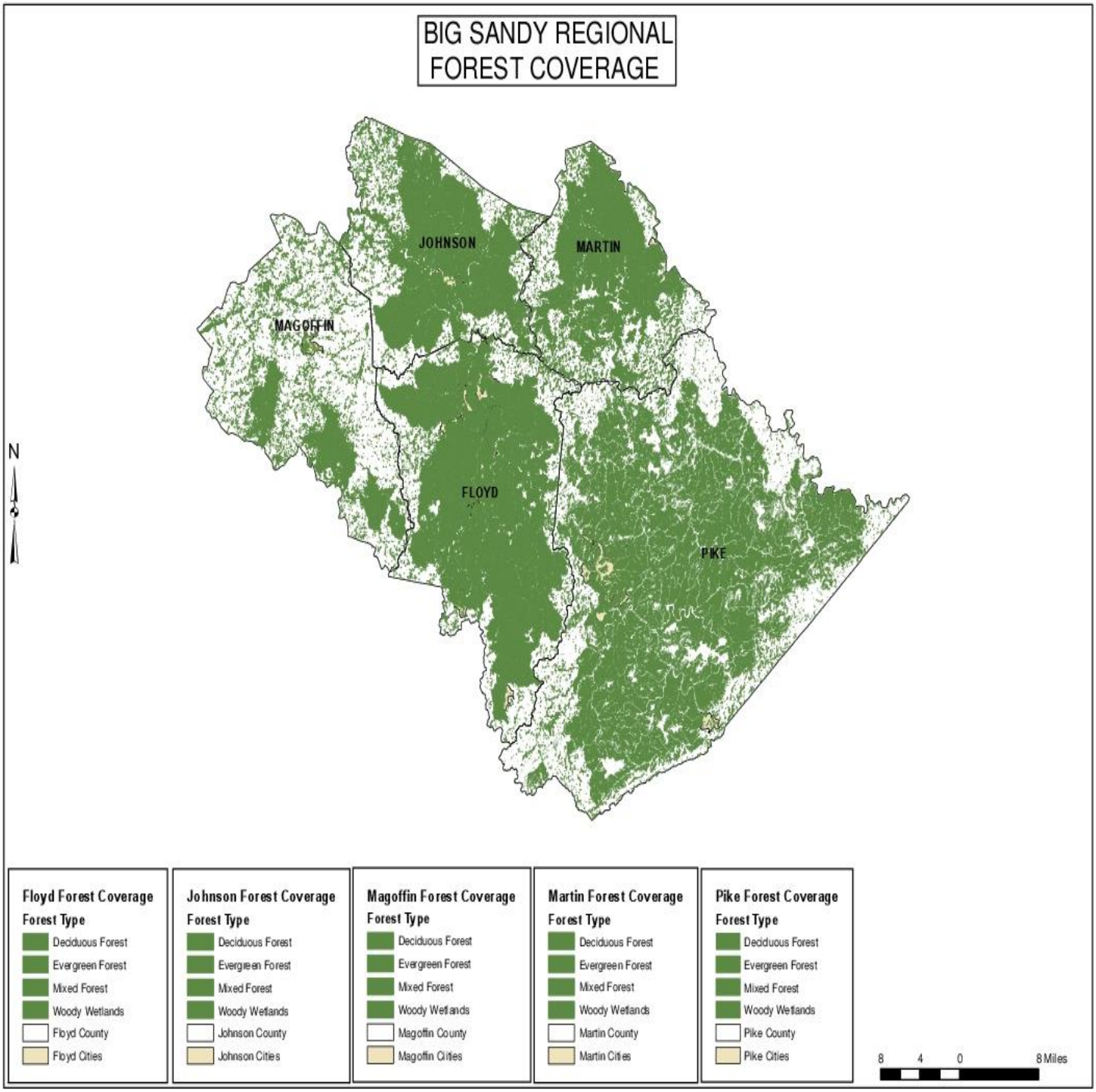
The physical characteristics of the BSADD region make it at times vulnerable to wildfires. The topography consists of areas of extreme slope which allow fires to spread rapidly and make fighting them difficult. There is adequate fuel in the region, although there are no large uninterrupted tracts of forest land. The region is predominantly rural and tree covered. The following map of forest cover illustrates the amount of vegetative fuels in the region. The map does not indicate the lack of development throughout the region however. The development pattern outside of the urban areas consists of extremely low density spatially distributed houses and small farms. Such development often does not appear in land use data derived from remote sensing technologies and therefore appears as entirely forested. Because of this development pattern, the urban-wildland interface is very difficult to define.

During the summer and fall seasons, the weather conditions are occasionally dry for lengthy periods of time and make wildfires more likely. In the BSADD region there were over 4,000 recorded wildfires from 2000 to 2014 according to Kentucky Division of Forestry data. The average reported wildfire burnt close to 50 acres per event. As you can see from the table below the Department of Forestry estimated that over $80 million dollars has been lost in timber value due to wildfires over the last 15 tears and nearly $2 million dollars has been spent fighting them. The reported fire locations are illustrated for each county on the following maps.

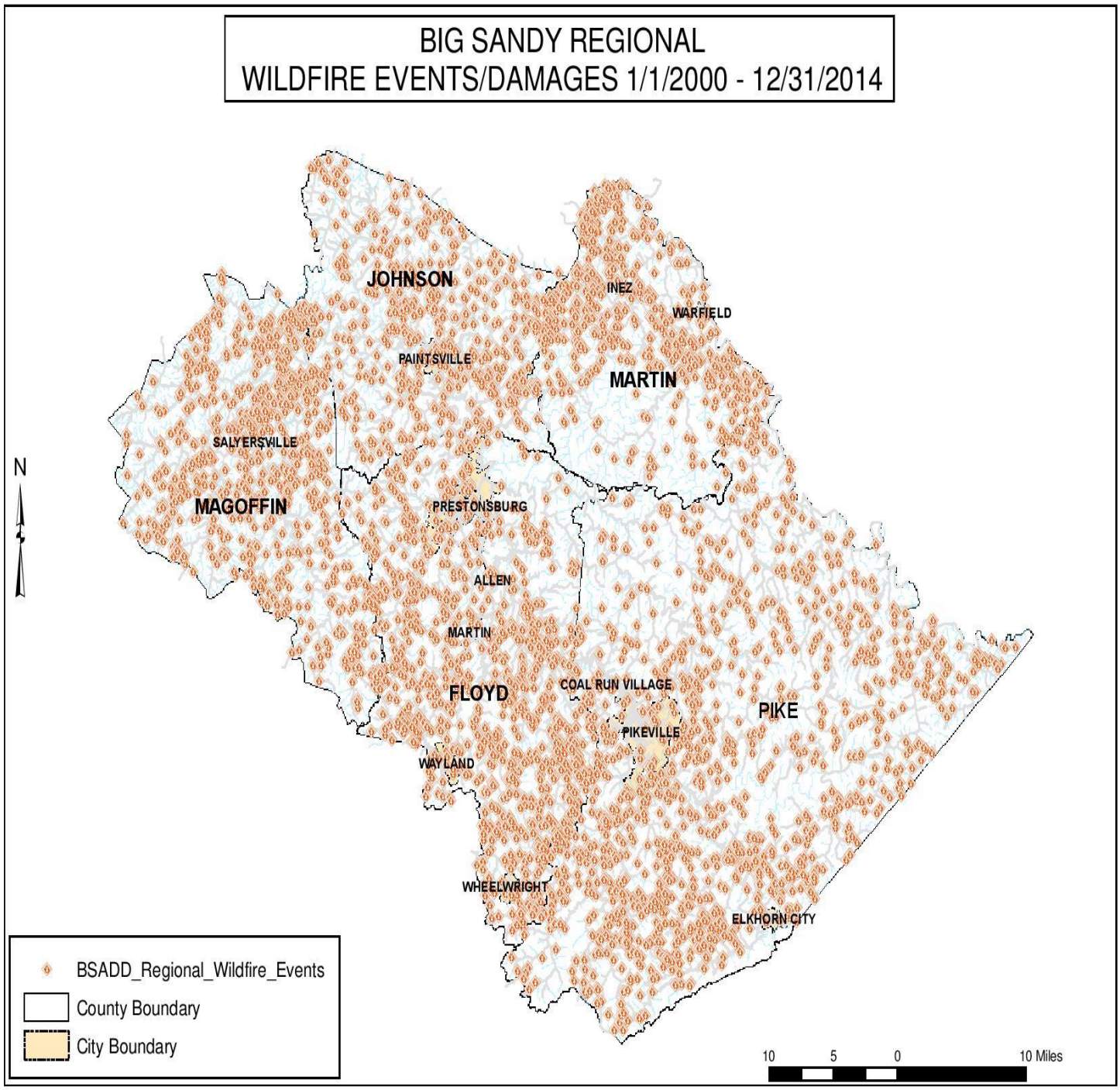
[20]Regional Wildfire Data – 01/01/2000 – 12/31/2014

County	Reported Fires	Acres Burned	$ Spent Fighting Fires	$ Lost in Timber Value
Floyd	997	49.014	$445,372	$19,324,920
Pike	1,257	93,415	$651,599	$36,992,179
Johnson	496	13,258	$223,123	$5,225,780
Magoffin	796	23,904	$312,700	$9,378,214
Martin	565	24,597	$241,333	$9,336,763
Regional Totals	4,111	204,188	$1,874,127	$80,257,856

[20] Data reported from the Southeast Region Division of Forestry, Hazard Ky.


BIG SANDY REGIONAL
FOREST COVERAGE
JOHNSON
MARTIN
MAGOFFIN
FLOYD
PIKE
N
Floyd Forest Coverage
Forest Type
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
Floyd County
Floyd Cities
Johnson Forest Coverage
Forest Type
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
Johnson County
Johnson Cities
Magoffin Forest Coverage
Forest Type
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
Magoffin County
Magoffin Cities
Martin Forest Coverage
Forest Type
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
Martin County
Martin Cities
Pike Forest Coverage
Forest Type
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
Pike County
Pike Cities
8 4 0 8 Miles

[21]WILDFIRE MAP



[21] Wildfire data and maps courtesy of the Southeast Region Division of Forestry, Hazard Ky.

SUMMARY OF WILDFIRE PROFILE

The updated information shows that wildfires within the Big Sandy region have increased since the adoption of our original plan in 2006. New maps were included in this section for all counties illustrating the location of the wildfires within each county. As a result of increases in the number of wildfires within each county there has also been an increase in the probably percentage of wildfire in each county. Please note that Pike County has the highest probability percentage of having a wildfire within the region. Pike County is the largest county in the state of Kentucky based the number of square miles of acreage. The wildfires for all counties include acres burned for residential, commercial, industrial, economical, and agricultural land.

The maps above were created using data provided by the Southeast Region Division of Forestry. The data was used to create maps that define the location of wildfire events within the BSADD region. The Regional Mitigation Committee has determined that the best way to define the impact of wildfire events is based on acreage lost and dollars spent fighting the past occurrences. The Division of Forestry provided us with county level maps that illustrate the locations of reported wildfires in each county. The probability of a future event has been determined based on the frequency of past events in the region. The regional maps were created by the GIS department of the BSADD to illustrate the regional outlook and show the county with the greatest frequency and the greatest losses of acreage burned.

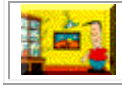
The Big Sandy ADD staff and the Regional Preparedness Council feel that wildfires in the region pose a threat to property and crops. The remote location of a lot of the region makes it difficult to fight a lot of the fires and thus make the likelihood of increased acreage being burned. This makes the region very susceptible to having widespread property damage. The probability of wildfires in the region is medium. The committee plans to monitor this and implement any future mitigation measures as necessary.

EARTHQUAKE (4.2.7)

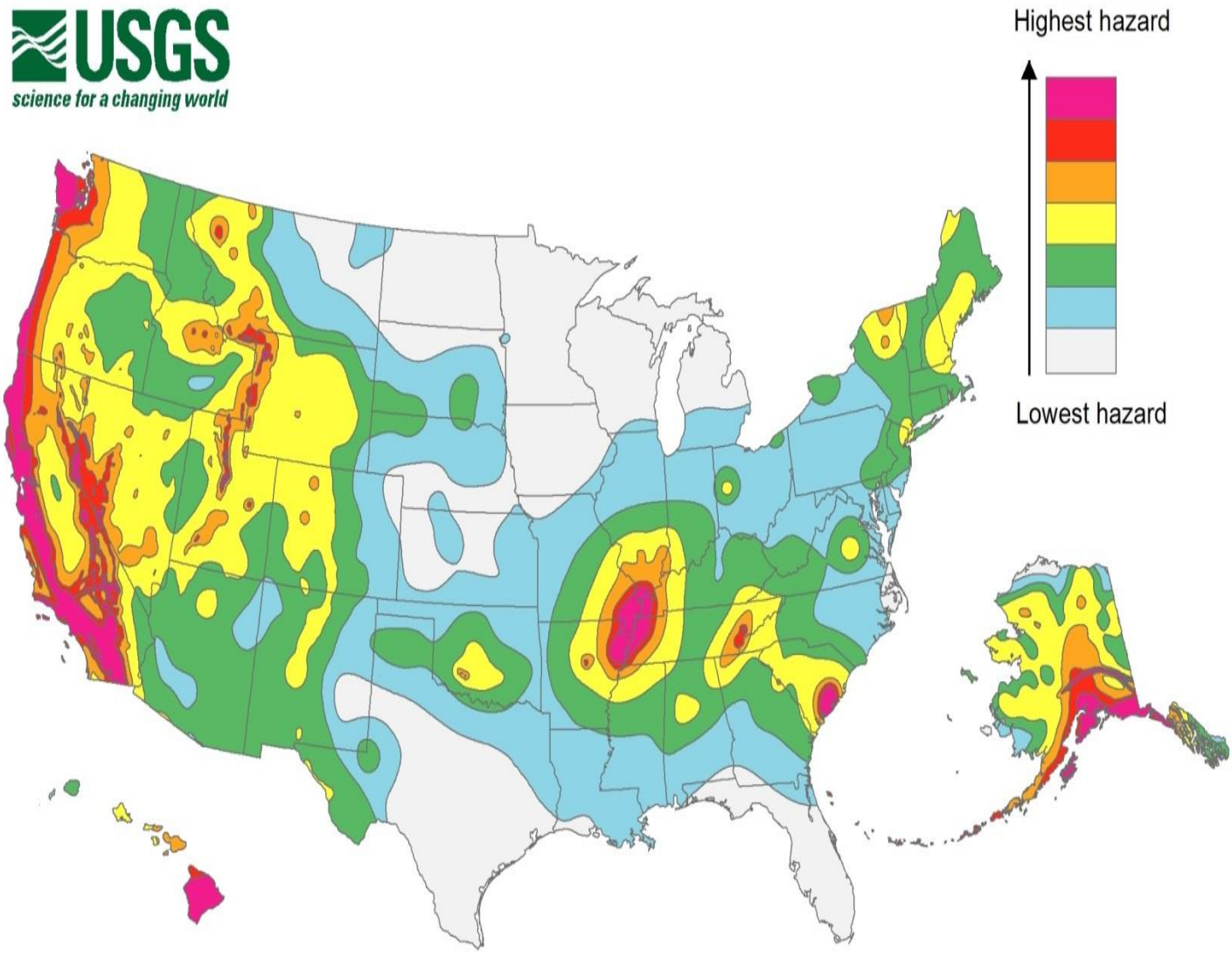
Earthquakes are one of nature's most damaging hazards. An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of Earth's tectonic plates. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and after just a few seconds can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure.

Earthquakes are more widespread than is often realized. The area of greatest seismic activity in the United States is along the Pacific Coast in California and Alaska, but as many as 40 states can be characterized as having at least moderate earthquake risk. For example, seismic activity has been recorded in Boston, Massachusetts; New Madrid, Missouri; and Charleston, South Carolina, places not typically thought of as earthquake zones. Areas prone to earthquakes are relatively easy to identify in the Western United States based on known geologic formations; however, predicting exactly when and where earthquakes will occur is impossible.

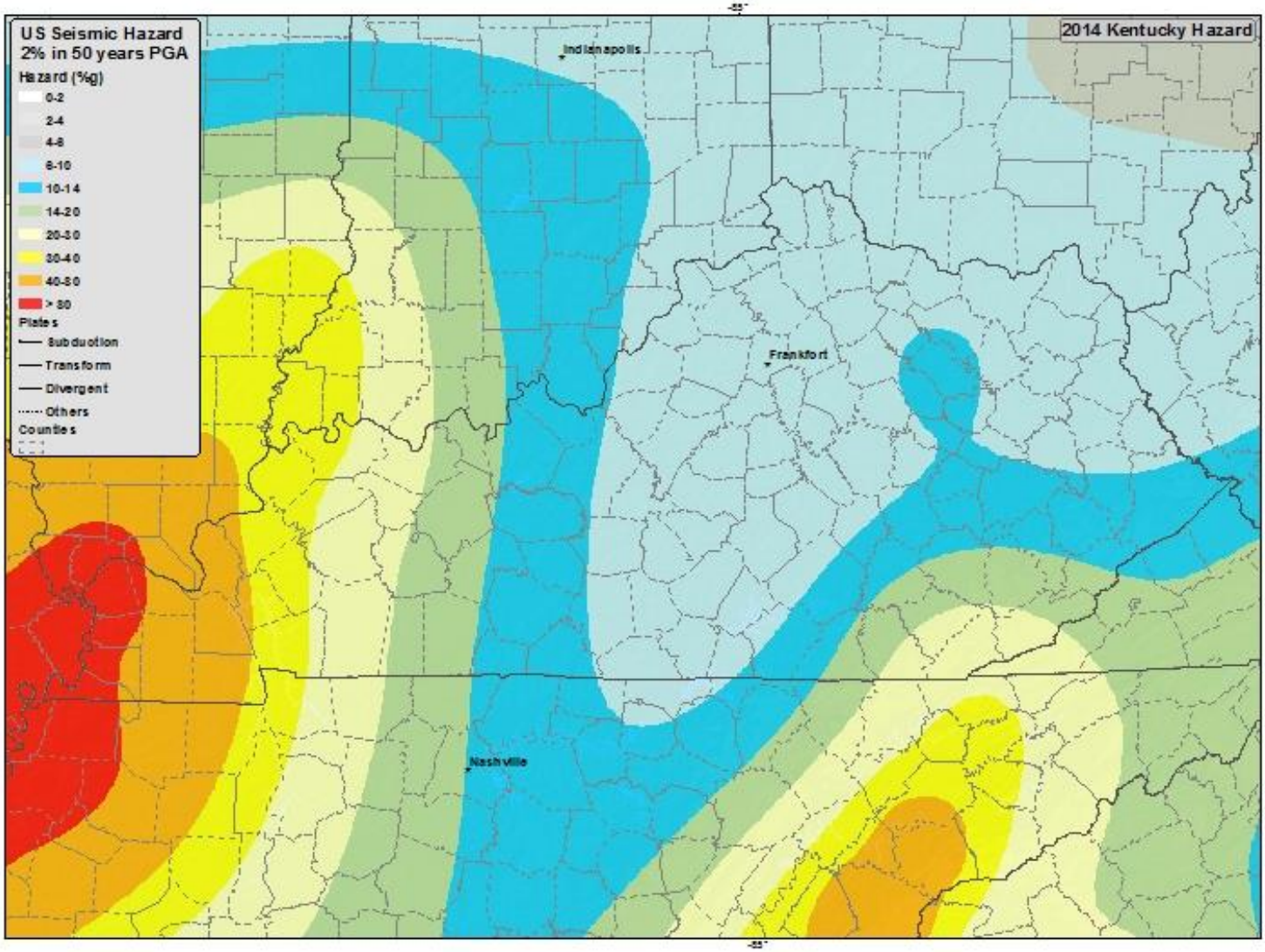
The BSADD region has no history of significant earthquakes. There have been some minor tremors but no documented damage causing earthquakes within the region. The Modified Mercalli Intensity scale of earthquakes describes the magnitude and severity of earthquakes at different intensity levels.

_MMI Value		Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	**I.**	.	.	Not felt. Marginal and long period effects of large earthquakes.
	**II.**	.	.	Felt by persons at rest, on upper floors, or favorably placed.
	**III.**	.	.	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
	**IV.**	.	.	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In upper range of IV, wooden walls and frame creak.

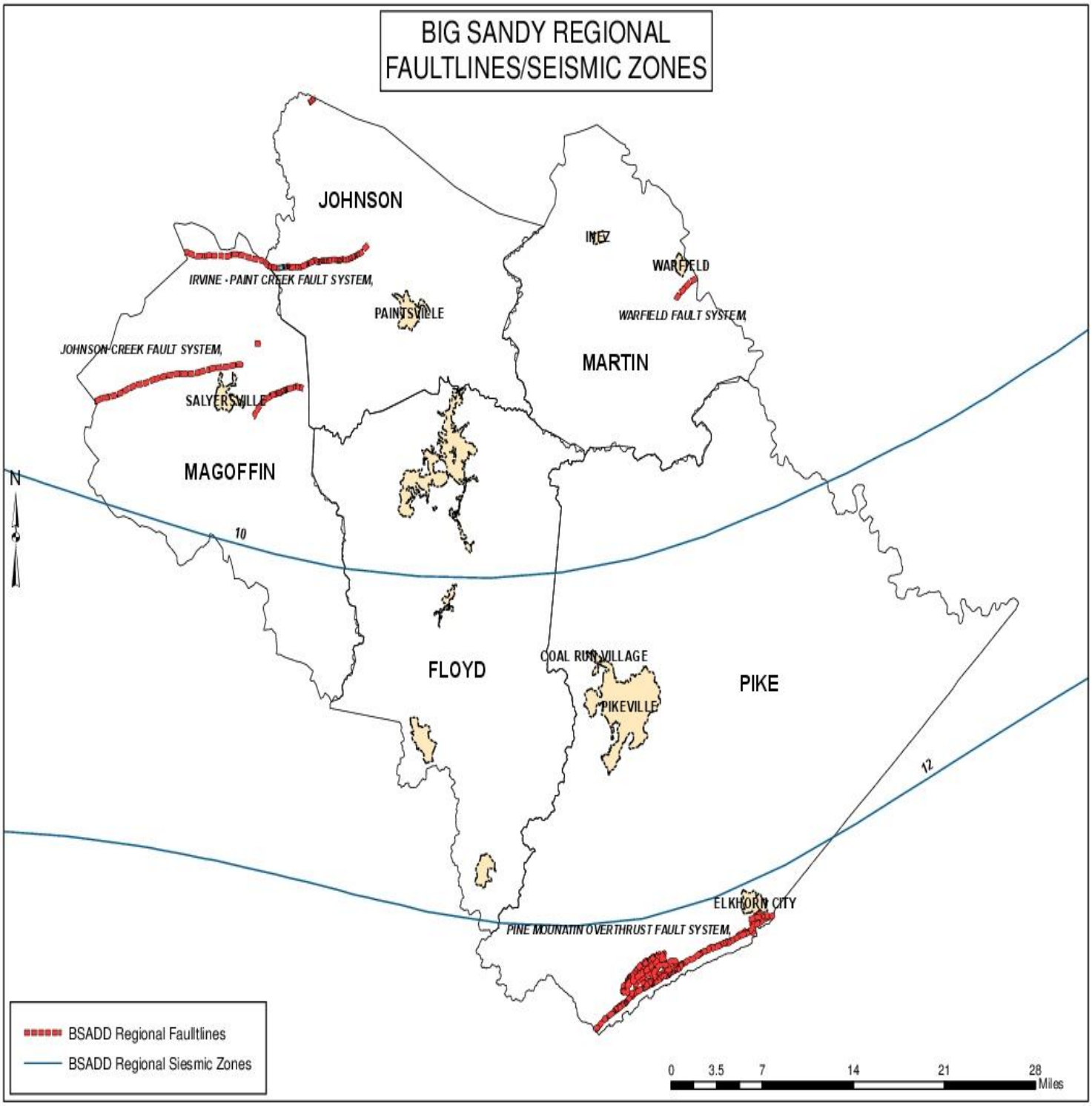
	**V.**	**Light**	**Pictures Move**	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
	**VI.**	**Moderate**	**Objects Fall**	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle).
	**VII.**	**Strong**	**Nonstructural Damage**	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
	**VIII.**	**Very Strong**	**Moderate Damage**	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
	**IX.**	**Violent**	**Heavy Damage**	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluvial areas sand and mud ejected, earthquake fountains, sand craters.
	**X.**	**Very Violent**	**Extreme Damage**	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
	**XI.**	.	.	Rails bent greatly. Underground pipelines completely out of service.
	**XII.**	.	.	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.


USGS
science for a changing world
Highest hazard
Lowest hazard

[22]KENTUCKY 2014 SEISMIC HAZARD MAP



[22] Kentucky 2014 Seismic Hazard Map. Taken from earthquake.usgs.gov


BIG SANDY REGIONAL
FAULTLINES/SEISMIC ZONES
JOHNSON
INEZ
WARFIELD
IRVINE - PAINT CREEK FAULT SYSTEM
PAINTSVILLE
WARFIELD FAULT SYSTEM
JOHNSON CREEK FAULT SYSTEM
MARTIN
SALYERSVILLE
MAGOFFIN
N
10
FLOYD
COAL RUN VILLAGE
PIKE
PIKEVILLE
12
ELKHORN CITY
PINE MOUNTAIN OVERTHRUST FAULT SYSTEM
BSADD Regional Faultlines
BSADD Regional Siesmic Zones
0 3.5 7 14 21 28
Miles

[23]SUMMARY OF EARTHQUAKE PROFILE

In reviewing the" Earthquake model" it is noted that, HAZUS doesn't expect any damage to occur to any of the structures in the Big Sandy region as a result of an earthquake. This includes residential, commercial, and critical facilities. No human casualties or income loss is expected to occur. As a whole, the Big Sandy region can expect almost no interruption as far as damage from an earthquake is concerned. The Regional Mitigation Committee public input and BSADD Board of Directors identified the following hazard not to have significant future potential impacts on any of the jurisdictions in the Big Sandy. The Regional Mitigation Committee feels that earthquakes are already addressed in a sufficient manner by other plans and agrees with the findings in the earthquake model. Although the five county Big Sandy region is susceptible to earthquake shock waves, no evidence exists that would suggest any potential significant damage would occur from a large quake on the New Madrid fault system or a moderate 5.0 quake on the Eastern Tennessee fault zone. The estimated average fluid ground motion is determined at less than 20% and, therefore, is ranked very low as hazards from which to mitigate effects.

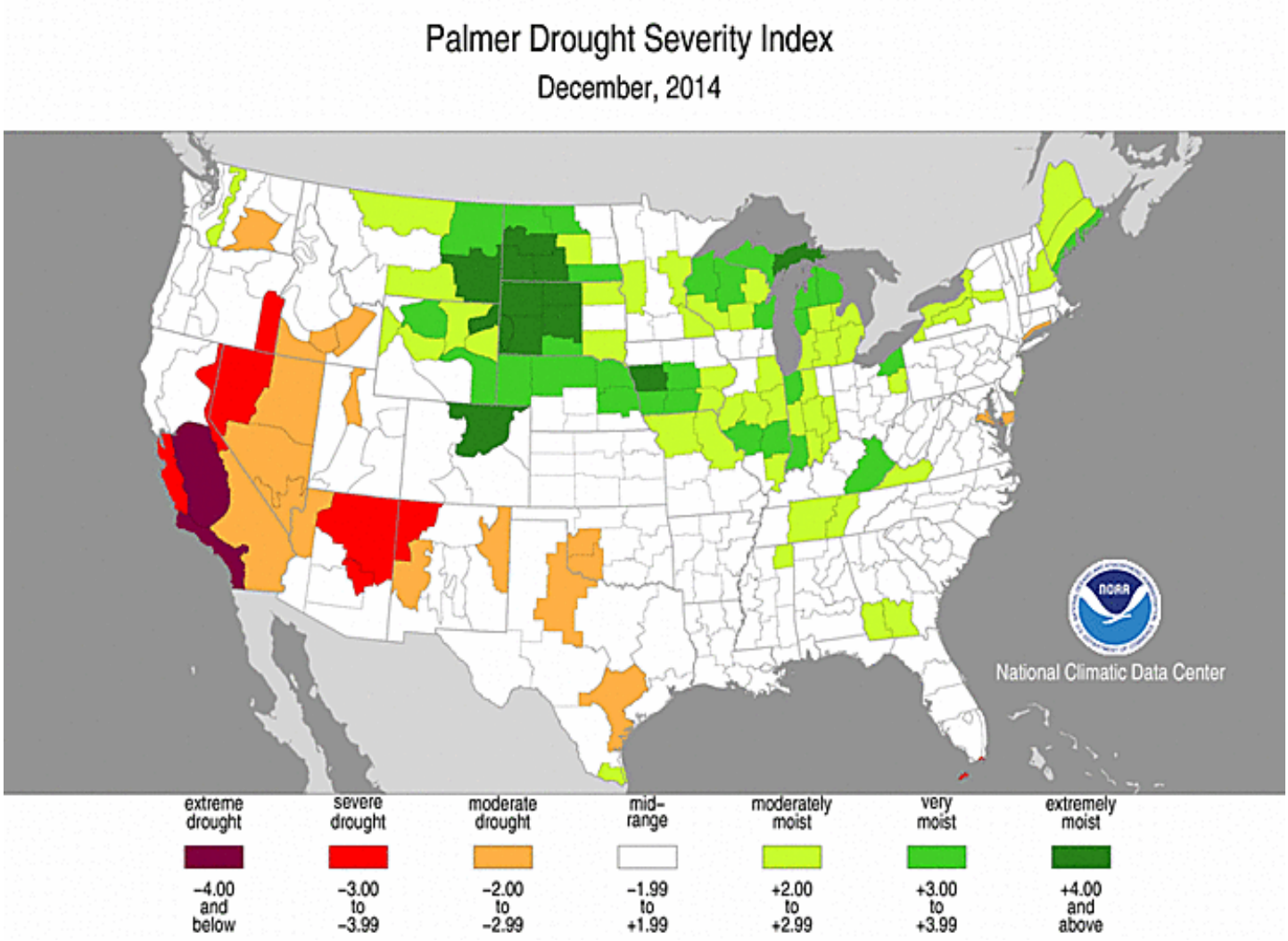
DROUGHT (4.2.8)

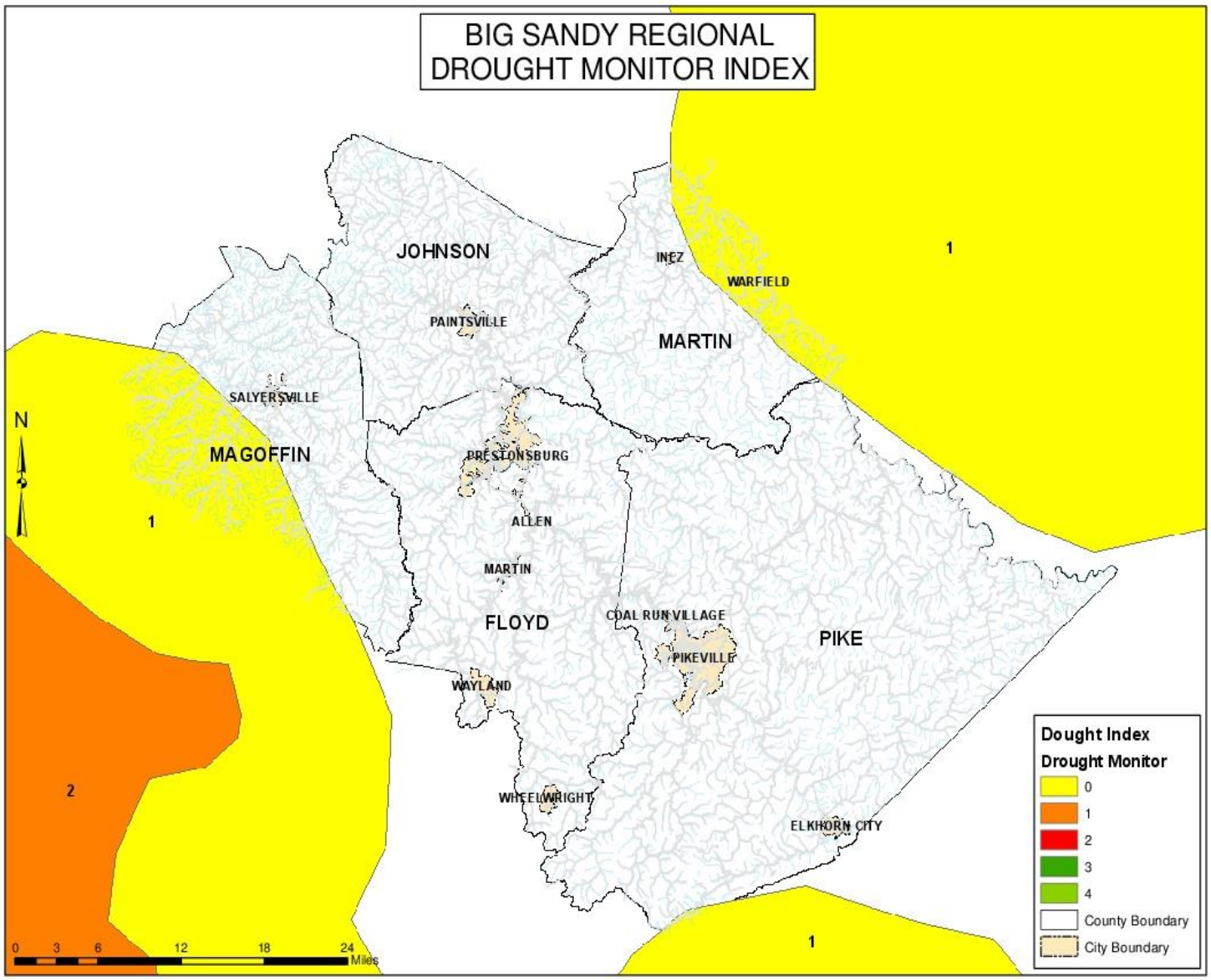
Drought can be defined as a water shortage caused by the natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. It can be aggravated by other factors such as high temperatures, high winds, and low relative humidity. The severity of drought can depend on the duration, intensity, geographic extent, and the regional water supply demands made by human activities and vegetation. The primary threat posed by drought is crop damage or failure and water supply shortages. There is no significant history of major damage causing droughts in the Big Sandy Region. The climate of region is conducive to significant dry periods during the summer months; however the average annual precipitation for the region at 42.92 inches is adequate, and generally distributed throughout the year enough that large scale droughts of long duration with significant agricultural losses and water supply shortages are not common.

The Palmer Index uses temperature and rainfall information in a formula to determine dryness. It uses a 0 as normal, and drought is shown in terms of minus numbers; for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought. The following maps illustrate the magnitude and severity of drought conditions in December

[23] Data taken from usgs.gov

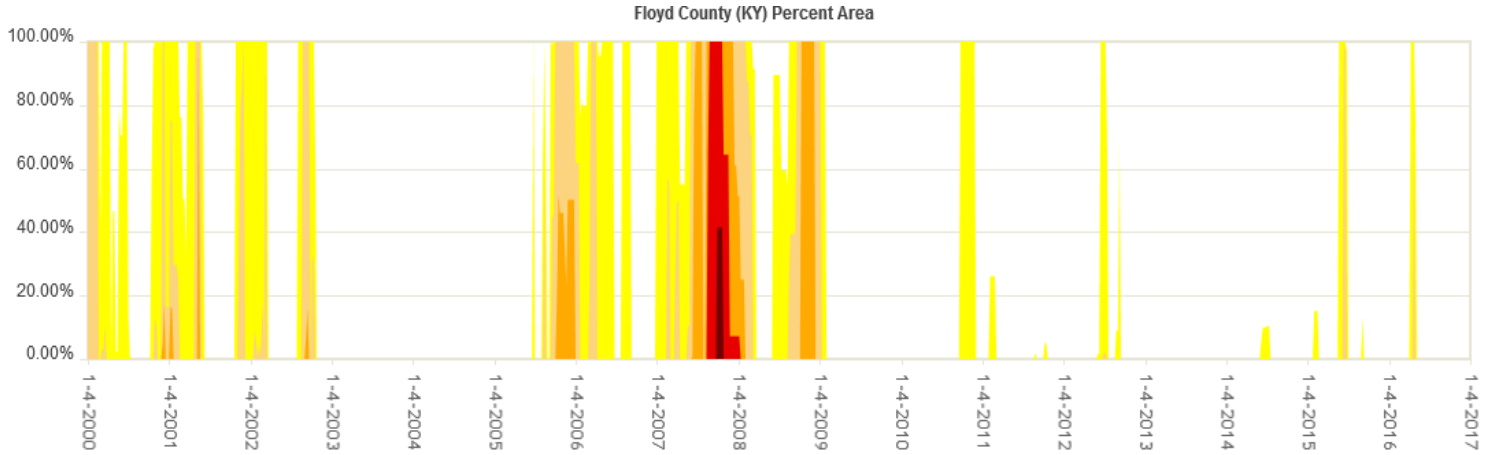
2014.

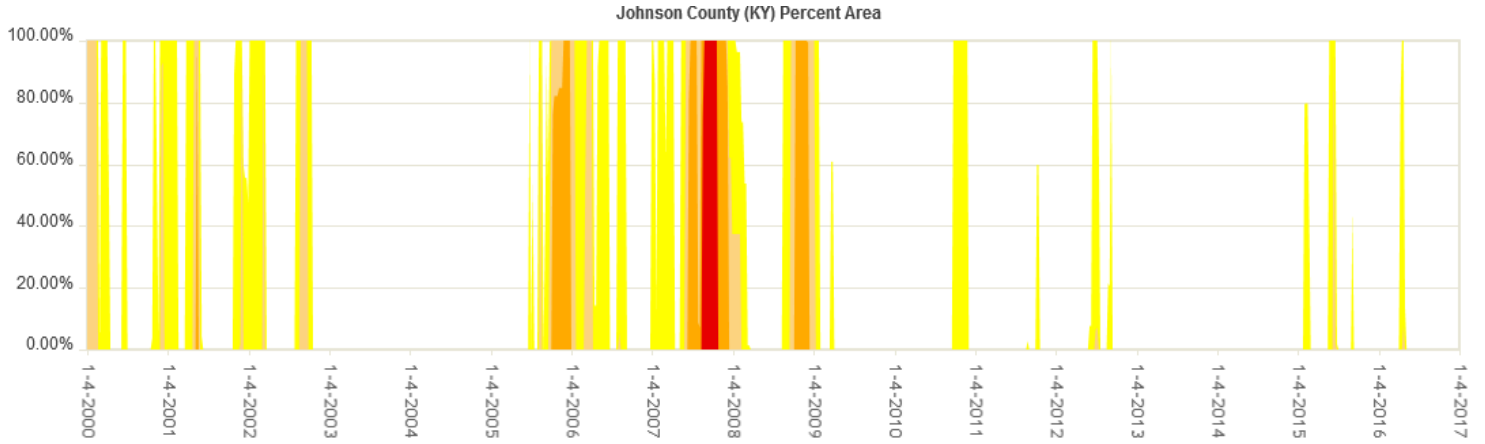

Palmer Drought Severity Index
December, 2014
National Climatic Data Center
extreme drought
−4.00 and below
severe drought
−3.00 to −3.99
moderate drought
−2.00 to −2.99
mid-range
−1.99 to +1.99
moderately moist
+2.00 to +2.99
very moist
+3.00 to +3.99
extremely moist
+4.00 and above

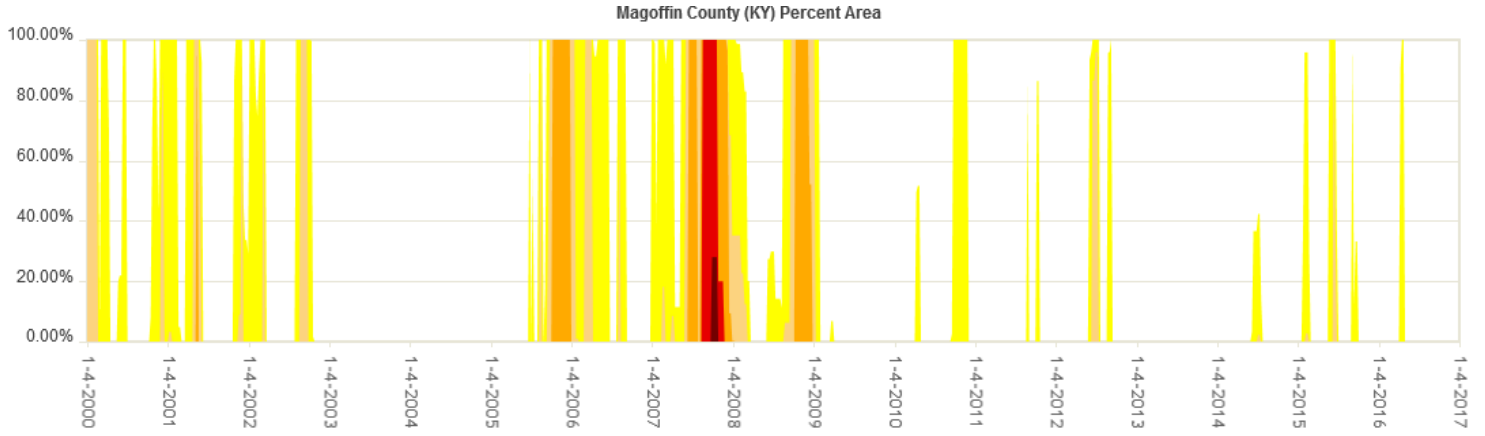

BIG SANDY REGIONAL
DROUGHT MONITOR INDEX
JOHNSON
INEZ
WARFIELD
PAINTSVILLE
MARTIN
SALYERSVILLE
MAGOFFIN
PRESTONSBURG
ALLEN
MARTIN
FLOYD
COAL RUN VILLAGE
PIKE
PIKEVILLE
WAYLAND
WHEELWRIGHT
ELKHORN CITY
1
1
1
2
N
0 3 6 12 18 24
Miles
Dought Index
Drought Monitor
0
1
2
3
4
County Boundary
City Boundary

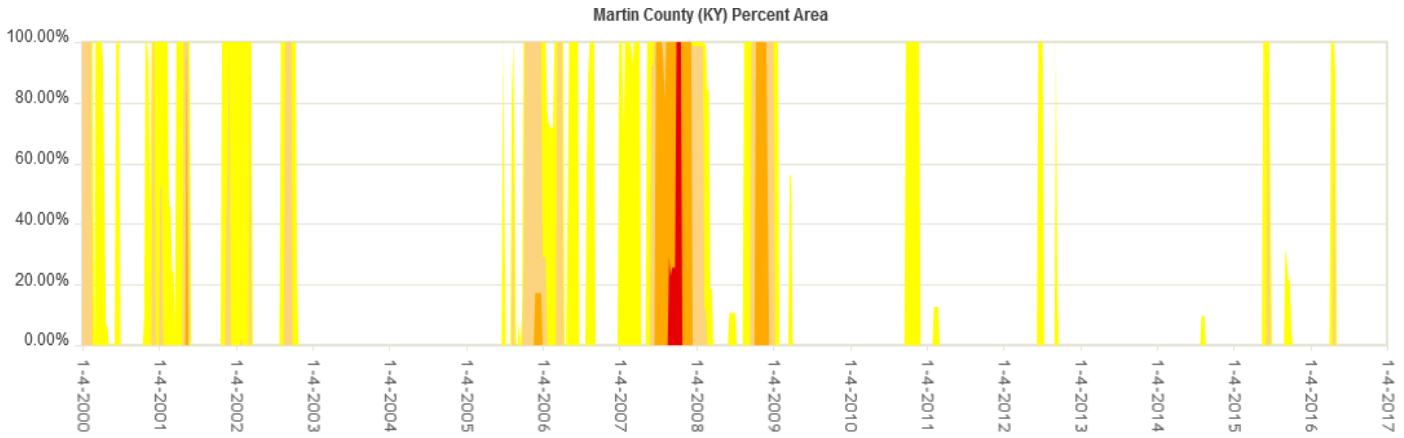
SUMMARY OF DROUGHT PROFILE

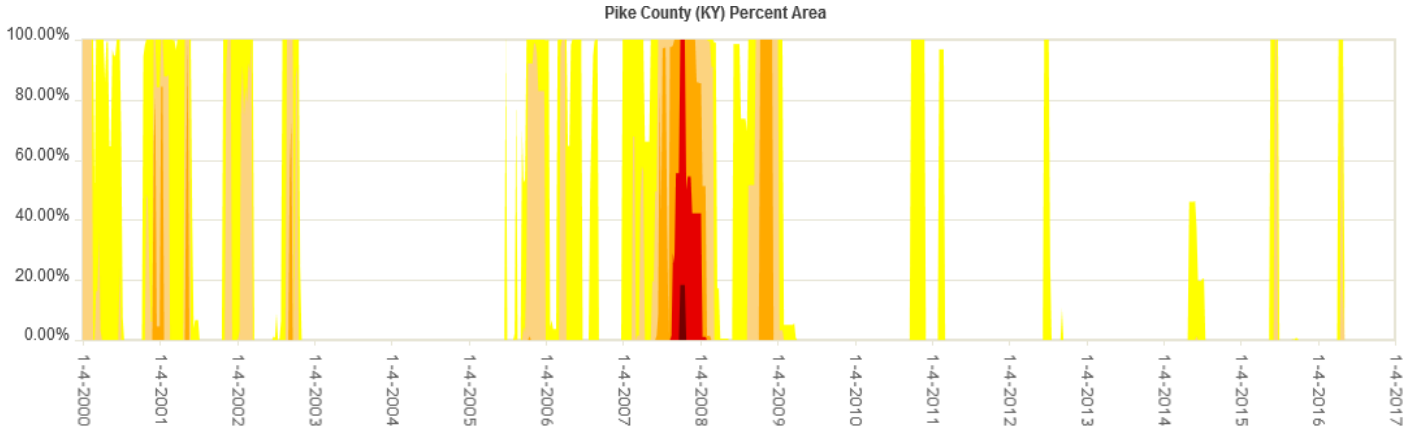
Another way to view the risk to the Big Sandy Region from drought would be to view identifications of drought from the United States Drought Monitor for each of the Big Sandy Region's counties. The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Maps courtesy of NDMC-UNL:











These charts are snapshots of a tool that is updated weekly with drought identification. For the full effect, this plan cites the United States Drought Monitor Statistics Graph that can be isolated to specific counties and can be isolated to specific weeks: http://droughtmonitor.unl.edu/MapsAndData/Graph.aspx.

The above graphs display the percentage of the county under one of five (5) classifications of "drought" (whose interpretations closely link to the Palmer Drought Severity Index) during a given week from January 1, 2000 to currently. Specifically: "U.S. Drought Monitor maps come out every Thursday morning at 8:30 Eastern Time, based on data through 7 a.m. Eastern Standard Time (8 a.m. Eastern Daylight Time) the preceding Tuesday. The map is based on measurements of climatic, hydrologic and soil conditions as well as reported impacts and observations from more than 350 contributors around the country. Eleven climatologists from the partner organizations take turns serving as the lead author each week. The authors examine all the data and use their best judgment to reconcile any differences in what different sources are saying[24]."

The categories of drought and their respective color-coding is as follows:

- **D0: Abnormally Dry**
- **D1: Moderate Drought**
- **D2: Severe Drought**
- **D3: Extreme Drought**
- **D4: Exceptional Drought**

In order to address previous occurrences of drought and, subsequently, probability as a function of previous occurrences and to inform vulnerability to future occurrences, this analysis considers the points where the U.S. Drought Monitor (USDM) and the Palmer Drought Severity Index (PDSI) intersect, namely at "D2: Severe Drought" (USDM) and "-2.00 to -2.99:

[24] See http://droughtmonitor.unl.edu/AboutUSDM/Background.aspx.

Moderate Drought" (PDSI). In other words, this analysis will interpret previous occurrences of drought to the Big Sandy's counties as those occurrences on the USDM graphs above highlighted orange to maroon.

From the USDM graphs of Big Sandy's counties above, the first observation immediately apparent is that instances of drought affect each of the Big Sandy region's counties similarly: For example, Martin County did not have "D3: Extreme Drought" during a year that Pike County did not. The exception to this observation is the maroon-colored "Exceptional Drought" category that affected percentages of areas within some of Big Sandy's counties and not others during 2007. However, beyond emphasizing the degree to which drought affected some percentage of area for a certain number of weeks within Floyd, Magoffin, and Pike Counties during 2007, it remains that 2007 to early 2008 was a banner time for drought for all of Big Sandy's counties.

So, one way to assess previous occurrences and resulting probability is to "eyeball" the USDM D2- to D4-category (PDSI Moderate- to Extreme-category) droughts for the entire region in terms of years: Floyd, Johnson, Magoffin, Martin, and Pike counties suffered USDM "Severe" to "Exceptional" drought (PDSI "Moderate" to "Severe") during four (4) of the past 16 years since 2000[25]. Twenty-five percent (25%) of the past sixteen years has witnessed "drought" as defined by USDM "Severe" to "Exceptional" and PDSI "Moderate" to "Severe" categories. Alternatively, since the approval of the Big Sandy ADD jurisdictions' previous hazard mitigation plan update (2011), none of the Big Sandy region counties suffered USDM "Severe" to "Exceptional" (PDSI "Moderate" to "Severe") drought. So for 0 of past 5 years, "drought" has not occurred in each of Big Sandy's counties.

More accurately, this assessment tabulates below the number of consecutive weeks that any percentage of each of the Big Sandy region's counties experienced USDM D2- to D4-category (PDSI Moderate- to Extreme-category) drought during the past 16 years. The U.S. Drought Monitor recorded 835 weeks of data (to the end of 2015) from which to compare the number of weeks each of Big Sandy's counties experienced drought and, thus, from which to calculate a percentage that serves as a probability illustration:

FLOYD	D2	Weeks Recorded (D2)	D3	Weeks Recorded (D3)	D4	Weeks Recorded (D4)
# of Consecutive Weeks	2	12/5/2000 – 12/12/2000	22	8/21/2007 – 1/8/2008	4	10/2/2007 – 10/23/2007
	2	1/9/2001 – 1/16/2001				
	1	5/15/2001				
	1	9/17/2002				
	12	10/11/2005 – 12/27/2005				
	7	6/12/2007 – 7/24/2007				
	25	8/14/2007 – 1/29/2008				
	9	10/14/2008 – 12/9/2008				
TOTAL # WEEKS	**59**		**22**		**4**	
PERCENTAGE (/835)	***7.1%***		***2.6%***		***0.5%***	

JOHNSON	D2	Weeks Recorded (D2)	D3	Weeks Recorded (D3)	D4	Weeks Recorded (D4)
# of Consecutive Weeks	1	5/15/2001	10	8/21/2007 – 10/23/2007		
	12	10/11/2005 – 12/27/2005				
	26	6/19/2007 – 12/11/2007				
	9	10/14/2008 – 12/9/2008				
TOTAL # WEEKS	**48**		**10**		**0**	
PERCENTAGE (/835)	***5.7%***		***1.2%***		***0.0%***	

[25] 2001, 2005, 2007, and 2008

MAGOFFIN	D2	Weeks Recorded (D2)	D3	Weeks Recorded (D3)	D4	Weeks Recorded (D4)
# of Consecutive Weeks	1	5/15/2001	14	8/21/2007 – 11/20/2007	4	10/2/2007 – 10/23/2007
	12	10/11/2005 – 12/27/2005				
	6	6/19/2007 – 7/24/2007				
	22	8/14/2007 – 1/8/2008				
	11	10/14/2008 – 12/23/2008				
TOTAL # WEEKS	**52**		**14**		**4**	
PERCENTAGE (/835)	***6.2%***		***1.7%***		***0.5%***	

MARTIN	D2	Weeks Recorded (D2)	D3	Weeks Recorded (D3)	D4	Weeks Recorded (D4)
# of Consecutive Weeks	1	5/15/2001	9	8/28/2007 – 10/23/2007		
	5	11/29/2005 – 12/27/2005				
	25	6/26/2007 – 12/11/2007				
	9	10/14/2008 – 12/9/2008				
TOTAL # WEEKS	**40**		**9**		**0**	
PERCENTAGE (/835)	***4.8%***		***1.1%***		***0.0%***	

PIKE	D2	Weeks Recorded (D2)	D3	Weeks Recorded (D3)	D4	Weeks Recorded (D4)
# of Consecutive Weeks	7	12/5/2000 – 1/16/2001	24	8/21/2007 – 1/29/2008	5	10/2/2007 – 10/23/2007
	2	5/8/2001 – 5/15/2001				
	2	9/10/2002 – 9/17/2002				
	1	10/18/2005				
	37	6/12/2007 – 2/19/2008				
	9	10/14/2008 – 12/9/2008				
TOTAL # WEEKS	**58**		**24**		**5**	
PERCENTAGE (/835)	***6.9%***		***2.9%***		***0.6%***	

Again, assuming that “drought” is most accurately or illustratively defined by the intersection between the U.S. Drought Monitor classifications and the Palmer Drought Severity Index classifications, it is apparent that a very small percentage of the 835 weeks comprising the 16 years ending on the last week of 2015 has been characterized by drought.

The future probability of a drought occurrence in the Big Sandy Region based on previous occurrences recorded since the inception of hazard mitigation planning as a prerequisite for grant funding is minimal. The Big Sandy Region is more likely to experience short-term dry periods of elevated temperatures and decreased rainfall. Still, one area that could possibly be impacted by drought conditions is the water supply. Many of the water system providers of the region withdraw water from either the Levisa Fork of the Big Sandy River or the Licking River. Although the Levisa Fork has not been susceptible to drought conditions historically, the Licking River has been susceptible to these conditions and this has caused problems for water supply in Magoffin County. From this recent-past drought occurrence, the Magoffin County Water District has interconnected with Paintsville Utilities, Prestonsburg Utilities, and the Morgan County Water District. This interconnection gives the parties the option to purchase water from the other utilities in the case of future water shortage brought on by drought conditions.

As exposited in Section 4.3 below, in the past five years from 2011 to 2015, there have been no publicly recorded instances of drought and no publicly recorded impacts from, logically, drought or from heat/excessive heat. Deaths and crop damage as the primary impacts from heat have been recorded at $0 for each county. Still, the long-term impact of continued drought conditions on underground supplies is very difficult to assess. Many of the aquifers in eastern Kentucky have very long-term recharge rates. These recharge rates can range anywhere from a relatively short period 5–10 years to as much as 500 years. This makes it virtually impossible to estimate when the impacts of severe to extreme drought conditions will be reflected in the underground pools/streams from which these wells draw their water. The Regional Preparedness Council understands that even though the probability of a drought in the region is very low, they understand that public water supplies are susceptible to the impact from drought or non-drought conditions.

DAM FAILURE (4.2.9)

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams typically are constructed of earth, rock, concrete, or mine tailings. A dam failure is an accidental or unintentional collapse, breach, or other failure of an impoundment structure that results in downstream flooding. Because dams are man-made structures, dam failures are usually considered technological hazards. However, since most dam failures result from prolonged periods of rainfall, they are often cited as secondary or cascading effects of natural flooding disasters and are not named as the primary hazard that causes disaster declarations.

A dam impounds water in the upstream area, referred to as the reservoir. The amount of water impounded is measured in acre-feet. 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 many acre-feet of water. Two factors influence the potential severity of a full or partial dam failure: (1) the amount of water impounded, and (2) the density, type, and value of development and infrastructure located downstream.

Dam failures can result from any one or a combination of the following causes:

- prolonged periods of rainfall and flooding, which cause most failures
- inadequate spillway capacity, resulting in excess overtopping flows
- internal erosion caused by embankment or foundation leakage or piping
- improper design
- improper maintenance
- negligent operation
- failure of upstream dams on the same waterway

Classification of Dams	
Classification	**Description**
Class A (low)	No loss of human life is expected and damage will only occur to the dam owner's property in the event of dam failure
Class B (Moderate/Significant)	Loss of Human life is not probable, but economic loss, environmental damage and disruption of lifeline facilities can be expected.
Class C (High)	Loss of one or more human life is expected.
FEMA 333: ***Federal Guidelines for Dam Safety: Hazard Potential Classifications for Dams***	

The U.S. Army Corps of Engineers also owns 3 major dams in the five county region (Fishtrap Dam, Dewey Dam, and Paintsville Lake Dam.)

[26]FLOYD COUNTY[27]

NAME OF DAM	CLASSIFICATION	LOCATION
MARSHELLETT DAM	CLASS C	IVYTON
GEORGE BROWN DAM	CLASS C	IVYTON
DAVID RESERVOIR DAM	CLASS A	DAVID
PRESTONSBURG GOLF COURSE	CLASS A	PRESTONSBURG

[28]PIKE COUNTY

NAME OF DAM	CLASSIFICATION	LOCATION
GRANTS BRANCH IMPOUNDMENT	CLASS C	BELFRY

[29]JOHNSON COUNTY

NAME OF DAM	CLASSIFICATION	LOCATION
BOB S DAM	CLASS A	RICHARDSON

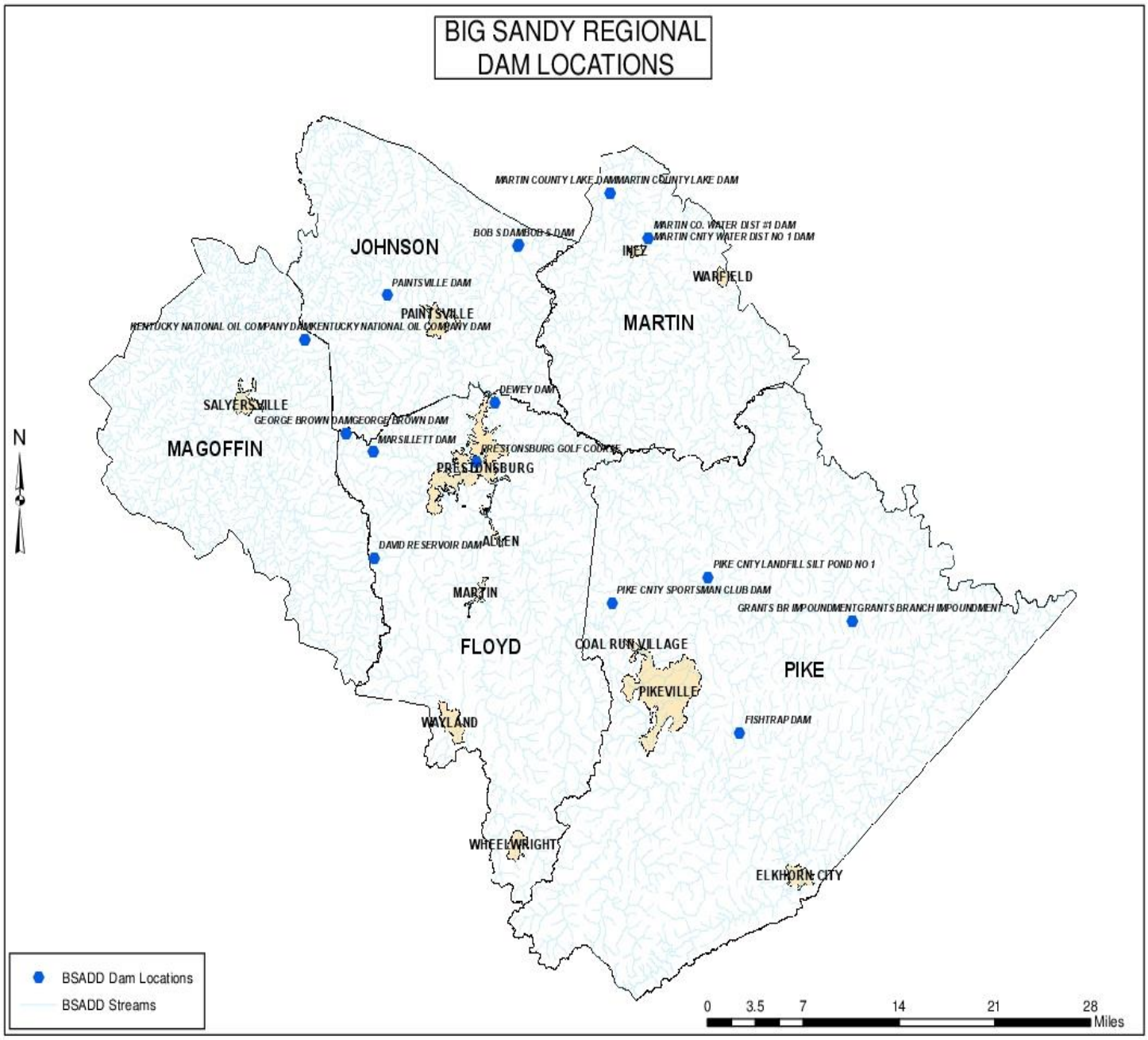
MAGOFFIN COUNTY

NAME OF DAM	CLASSIFICATION	LOCATION
KY NATIONAL OIL COMPANY DAM	CLASS A	OIL SPRINGS

MARTIN COUNTY

NAME OF DAM	CLASSIFICATION	LOCATION
MARTIN COUNTY WATER DISTRICT #1	CLASS C	INEZ
MARTIN COUNTY LAKE DAM	CLASS B	MILO

[26] All regional dam data has been taken from the Kentucky Department of Environmental Protection's Energy and Environment cabinet.
[27] The USCE owns Dewey Dam located in Floyd County.
[28] The USCE owned Fishtrap Dam is located in Pike County.
[29] The USCE owned Paintsville Lake Dam is located in Johnson County.


BIG SANDY REGIONAL
DAM LOCATIONS
MARTIN COUNTY LAKE DAM
MARTIN COUNTY LAKE DAM
BOB S DAM
BOB S DAM
MARTIN CO. WATER DIST #1 DAM
MARTIN CNTY WATER DIST NO 1 DAM
JOHNSON
INEZ
WARFIELD
PAINTSVILLE DAM
PAINTSVILLE
MARTIN
KENTUCKY NATIONAL OIL COMPANY DAM
KENTUCKY NATIONAL OIL COMPANY DAM
DEWEY DAM
SALYERSVILLE
GEORGE BROWN DAM
GEORGE BROWN DAM
MARSILLETT DAM
MAGOFFIN
PRESTONSBURG GOLF COURSE
PRESTONSBURG
ALLEN
DAVID RESERVOIR DAM
PIKE CNTY LANDFILL SILT POND NO 1
PIKE CNTY SPORTSMAN CLUB DAM
MARTIN
GRANTS BR IMPOUNDMENT
GRANTS BRANCH IMPOUNDMENT
FLOYD
COAL RUN VILLAGE
PIKE
PIKEVILLE
WAYLAND
FISHTRAP DAM
WHEELWRIGHT
ELKHORN CITY
N
BSADD Dam Locations
BSADD Streams
0 3.5 7 14 21 28
Miles

COAL IMPOUNDMENTS

The National Academy of Sciences defines black water as "water mixed with fine coal refuse," which is generally composed of fine coal, rock and clay particles with trace amounts of flocculants used to clarify the water that washes the coal. Black water is typically used to describe a substandard water discharge containing coal-processing waste or coal particles in high enough concentrations to discolor a stream. Spills can range from water with high turbidity to a release of a thick, semi-solid material. (Kentucky Environmental and Public Protection Cabinet 2001)

During the process of mining and cleaning coal, waste is created and must be permanently disposed of in an impoundment. Preparation of coal, also called washing, is how non-combustible materials are removed from the mine. As the coal is washed, waste is created and classified as either course refuse or fine refuse. Slurry, a combination of silt, dust, and water, bits of coal and clay particles is considered fine refuse, and is the most commonly disposed of material held in an impoundment. Between 20 to 50% of the material received at a coal preparation plant may be rejected and housed in impoundments (National research Council 2002). The course refuse is used to construct the impoundment dam, which then holds the fine refuse or slurry, along with any chemicals used to wash and treat the coal at the coal preparation plant. Impoundments are created a couple of different ways. Whenever possible, impoundments are constructed using naturally occurring basins, but are often built up on an embankment at the mouth of a watershed. They are reinforced with course refuse and are characteristic of a typical dam. After the waste is spilled into the basin, the coal particles are allowed to settle, leaving the leftover water on top. This water is often recycled and used once again by the preparation plant. Settling ponds are constructed nearby to catch the runoff of excess water through a pumping system, and excess water from these ponds is discharged into a local waterway

According to coalimpoundment.org there are 24 dams classified as "coal impoundments" in the Big Sandy region, 17 of which are in Pike County, 1 each in Johnson and Floyd County with the other 5 in Martin County.

[30]Impoundment Name	MSHA ID No.	Company	County
Butler Branch	1211-KY06-00002-02	FCDC Coal Inc	Floyd County
Lackey Branch	1211-KY06-00281-02	Beech Fork Processing Inc.	Johnson County
Big Branch	1211-KY06-00035-01	Martin County Coal Corp	Martin County
Big Hollow	1211-KY06-00034-01	Czar Coal Corp	Martin County
Holty Branch	1211-KY06-00051-04	Peter Cave Mining Co.	Martin County
Slurry Cells D1 and D2	1211-KY06-00143-04	17 West Virginia Inc	Martin County
Peter Cave Dam	1211-KY06-00143-02	17 West Virginia Inc	Martin County
Bear Hollow Impoundment	1211-KY06-00071-02	Sunny Ridge Mining Co.	Pike County
Big Groundhog Impoundment	1211-KY06-00231-02	Johns Creek Coal Co.	Pike County
Burke Branch Impoundment	1211-KY06-00373-01	Premier Elkhorn Coal Co.	Pike County
Chaparral Impoundment	1211-KY06-00226-02	Lodestar Energy Inc.	Pike County
Cow Branch Impoundment	1211-KY06-00196-05	McCoy Elkhorn Coal Corp	Pike County
Dotson Fork Impoundment	1211-KY06-00059-01	Chisholm Coal	Pike County
Enterprise Impoundment	1211-KY06-00266-02	Premier Elkhorn Coal	Pike County
Grant's Branch Impoundment	1211-KY06-00010-03	Stone Mining Co.	Pike County
Hopkins Fork Impoundment	1211-KY06-00066-05	Millard Processing Co.	Pike County
Long Fork Slurry Impoundment	1211-KY06-00017-01	Long Fork Coal Co.	Pike County
Millstone Branch II Impoundment	1211-KY06-00246-02	Holston Mining Inc.	Pike County

[30] All information taken from www.coalimpoundment.org

Millstone Branch Impoundment	1211-KY06-00246-01	Holston Mining Inc.	Pike County
New Ridge Impoundment	1211-KY06-00327-01	New Ridge Mining Co.	Pike County
Rob Fork Impoundment	1211-KY06-00111-02	Branham & Baker Coal Co.	Pike County
Scott's Branch Impoundment	1211-KY06-00142-01	M C Mining Inc.	Pike County
Sidney Impoundment	1211-KY06-00197-02	Sidney Coal Co. Inc	Pike County
Three Mile Impoundment	1211-KY06-00004-01	Branham & Baker Coal Co	Pike County

There have been 9 coal impoundment spills in the Big Sandy Region that have been documented by coalimpoundment.com going back as far as 1972. The Big Sandy region does own the unfortunate distinction of the worst spill in United States history; the 2000 Martin County spill. The 2000 Martin County spill was worst black water spill in the nation's history spilling over 309,000,000 gallons into Marin County. According to the EPA, the Martin County Sludge Spill was 30 times larger than the Exxon Valdez oil spill (i.e., 12 million gallons). The impact from the coal impoundment/dam failure amounted to about $46 million in cleanup costs (by Massey Energy) and $3.25 million in fines paid by parties deemed responsible (i.e., Martin County Coal) for the failure . Going back as far as data would allow (1987 was the first documented spill in the region), there have been 9 coal impoundment spills in the Big Sandy region with nearly all being small spills or having an undocumented spill volume. The puts the region at around a spill of some type every 3 years, making it a concern and worth noting but not posing a significant risk. There is no available data at this time, which indicates what impoundments are at risk for a spill.

SUMMARY OF DAM FAILURE PROFILE

The Regional Mitigation Committee along with BSADD staff conclude that since the Big Sandy Region is susceptible to any one or all of the potential causes for dam/levee failure, especially including flooding events and potential for massive landslides and that a majority of the region's dams are classified as high for potential hazards, forces the Hazard Mitigation Council to conclude that the future probability of Dam/Levee failures in the region is medium. The Regional Mitigation Committee along with the BSADD staff concludes that coal impoundments are a threat to the Big Sandy region. Martin County had the largest coal slurry spill in the nation's history in 2000. The future probability of a coal slurry spill is low to medium.

To date we haven't had any dam failures within the region. In 2010, the US Army Corps of Engineers added a sidewalk to the Paintsville Lake Dam in order to alleviate stresses that were being caused as a result of foot traffic across the dam. This measure was taken as a precautionary measure after the Wolfe Creek Dam in Russell County began to leak and fail. A section entitled federal guidelines to dam safety was added to this section of the plan. The issues faced by our local jurisdictions (dams) range from seepage/weeping, to overtopping, and foundation destabilization all of which over time and continued impacts could eventually lead to dam failure(s). The Regional Preparedness Council determined that even though the immediate risk(s) of failure may be low that the long term impacts and potential catastrophic loss of life and property is significant enough to keep a close watch on these dams. As more data is gathered over time this risk assessment will be further expanded and re-evaluated in subsequent plan updates. There are several Corps of Engineers reports on impoundment structures within the five county area. These reports are too large to include in this risk assessment. Since nothing has really changed at this point with regards to the region's dams, the Regional Preparedness Council still feels like the future probability of Dam/Levee failures in the region is low to medium.

SUMMARY AND CONCLUSIONS OF HAZARD PROFILES

The following tables represent the historic frequency at which the various hazard events have occurred in each county in the past. This is a good indicator of how often each hazard can be expected to occur in each county. This analysis is limited by the relatively short or non-existent historic records of several of the hazards and geographically limited to county level analysis. Future updates will address elements of hazard profiling and probability on a jurisdictional level as data becomes available.

FLOYD COUNTY HISTORIC FREQUENCY [31]

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events In Past 20 Year	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % Chance Per Year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year	Past 50 Year Record Frequency Per Year
Floods	97	15	66	N/A	N/A	0.15	646.7	6.6	N/A	N/A
Wildfire	997	15	--	N/A	N/A	0.02	6,646.7	--	N/A	N/A
Earthquake	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0
Tornado	2	64	1	1	2	32.00	3.1	0.1	0.05	0.04
Thunderstorm Wind	106	15	90	N/A	N/A	0.14	706.7	9.0	N/A	N/A
Drought	59	835[32]	53	N/A	N/A	0.27	7.1	10.1[33]	N/A	N/A
Severe Winter Storm	37	15	27	N/A	N/A	0.41	246.7	2.7	N/A	N/A
Landslide	1,226	41	--	--	N/A	0.03	8.2	--	--	N/A
Dam Failure	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0

PIKE COUNTY HISTORIC FREQUENCY

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events In Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % Chance Per Year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year	Past 50 Year Record Frequency Per Year
Floods	114	15	77	N/A	N/A	0.13	760.0	7.7	N/A	N/A
Wildfire	1,257	15	--	N/A	N/A	0.01	8,380.0	--	N/A	N/A
Earthquake	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0
Tornado	2	64	1	2	2	32.00	3.1	0.1	0.1	0.04
Thunderstorm Wind	229	15	192	N/A	N/A	0.06	1,526.7	19.2	N/A	N/A
Drought	58	835 (16)	47	N/A	N/A	0.28	6.9	9.0	N/A	N/A
Severe Winter Storm	46	15	34	N/A	N/A	0.33	306.7	0.0	N/A	N/A
Landslide	935	41	--	--	N/A	0.44	6.3	--	--	N/A
Dam Failure	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0

JOHNSON COUNTY HISTORIC FREQUENCY

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events In Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % Chance Per Year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year	Past 50 Year Record Frequency Per Year

[31] Those cells marked with " - -" (i.e., are empty) refer to the inability to disaggregate the data. For example, Big Sandy – through the Kentucky Geological Survey (KGS) could identify x amount of landslides over a 41 year period. However, there is no list of landslide events recorded per year.

[32] Drought's "Historic Record" is measured in weeks.

[33] Number of weeks in 10 years is about 520 weeks (52 weeks*10 years).

Floods	49	15	27	N/A	N/A	0.31	326.7	2.7	N/A	N/A
Wildfire	0	15	0	N/A	N/A	0.00	0.0	0.0	N/A	N/A
Earthquake	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0
Tornado	4	64	3	3	4	16.00	6.3	0.3	0.15	0.08
Thunderstorm Wind	122	15	92	N/A	N/A	0.12	813.3	9.2	N/A	N/A
Drought	48	835 (16)	47	N/A	N/A	0.33	5.7	9.0	N/A	N/A
Severe Winter Storm	28	15	19	N/A	N/A	0.54	186.7	1.9	N/A	N/A
Landslide	1,251	41	--	--	--	0.33	8.5	--	--	N/A
Dam Failure	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0

MAGOFFIN COUNTY HISTORIC FREQUENCY

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events In Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % Chance Per Year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year	Past 50 Year Record Frequency Per Year
Floods	35	15	15	N/A	N/A	0.43	233.3	1.5	N/A	N/A
Wildfire	0	15	0	N/A	N/A	0.00	0.0	0.0	N/A	N/A
Earthquake	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0
Tornado	2	64	1	2	2	32.00	3.1	0.2	0.1	0.04
Thunderstorm Wind	83	15	58	N/A	N/A	0.18	813.3	5.8	N/A	N/A
Drought	52	835 (16)	51	N/A	N/A	0.31	6.2	9.9	N/A	N/A
Severe Winter Storm	33	15	21	N/A	N/A	0.45	220.0	2.1	N/A	N/A
Landslide	547	41	--	--	N/A	0.075	3.8	--	--	N/A
Dam Failure	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0

MARTIN COUNTY HISTORIC FREQUENCY

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events In Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % Chance Per Year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year	Past 50 Year Record Frequency Per Year
Floods	42	15	22	N/A	N/A	0.36	280.0	2.2	N/A	N/A
Wildfire	0	15	0	N/A	N/A	0.00	0.0	0.0	N/A	N/A
Earthquake	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0
Tornado	1	64	1	1	1	64.00	1.6	0.1	0.05	0.02
Thunderstorm Wind	69	15	52	N/A	N/A	0.22	460.0	5.2	N/A	N/A
Drought	40	835 (16)	39	N/A	N/A	0.40	4.8	7.5	N/A	N/A
Severe Winter Storm	20	15	13	N/A	N/A	0.75	133.3	1.3	N/A	N/A
Landslide	917	41	--	--	N/A	0.045	6.3	--	--	N/A
Dam Failure	0	0	0	0	0	0.00	0.0	0.0	0.0	0.0

Several overall conclusions can be made based on the information gathered in the hazard profiles. Based on historical frequency and past disaster damages, several of the hazards stand out as more significant threats to the BSADD region, while several others appear to be less significant. According to the frequency and damage figures, Flooding, wildfires,

thunderstorm/wind, winter storms stand out as the most significant threats to the region. Tornado and landslides are also significant hazards that threaten the region. Wildfire has the most frequent occurrence out of all of the profiled hazards; however the only damages documented on these events are the amount of acreage consumed. There is no existing data indicating the loss of property or life due to wildfire in the region. Landslide is a hazard that is rated by committee members as one of the biggest threats, yet there is very little data to analyze the problem with. Earthquake, Drought, and Dam Failure are hazards that are possible threats to the region, yet historic frequency and damage data do not suggest that these are among the most significant.

4.3 ASSESSING VULNERABILITY: OVERVIEW

This section provides an overview description of each jurisdiction's vulnerability to individual hazards. The frequency of the hazard events and their impact on the community is assessed to identify the specific conditions of vulnerability for each jurisdiction. The data used in this analysis is limited in several ways. It is derived from various sources, including the National Climatic Data Center, United States Geological Survey, Kentucky Geological Survey, Kentucky Division of Forestry, and the Kentucky Division of Water. The historical record keeping for the various hazards differ substantially in time span. Due to the lack of standardization of the data sources, the vulnerability rating is a subjective observation based on these numbers and the recommendation of the county mitigation planning committees. Data in most cases is limited to county level; however these ratings do generally apply the same to each jurisdiction.

Floyd County – Prestonsburg, Allen, Martin, Wheelwright, Wayland

Hazard	Historical Events	Impact	10 Year Frequency	Vulnerability Rating
Flood	97	$18,000,000	6.6	High
Earthquake	0	0	0	Low
Tornado	2	$35,000	1.0	Moderate
Thunderstorm/Wind	106	$498,500.00	9.0	High
Landslide[34]	1,226	No Data	300[35]	High
Wildfire	997	49,014 Acres Burned	N/A	High
Severe Winter Storm	37	0	2.7	Moderate
Drought	0	0	0	Low
Dam Failure	0	0	0	Low

Pike County – Pikeville, Elkhorn City, Coal Run

Hazard	Historical Events	Impact	10 Year Frequency	Vulnerability Rating
Flood	114	$21,424,000	7.7	High
Earthquake	0	0	0	Low
Tornado	2	$5,000	1.0	Moderate
Thunderstorm/Wind	229	$1,022,000	19.2	High
Landslide	935	> $3,201,135	230	High
Wildfire	1,257	93,415 Acres Burned	N/A	High
Severe Winter Storm	46	$120,000	3.4	Moderate
Drought	0	0	0	Low
Dam Failure	0	0	0	Low

Johnson County - Paintsville

Hazard	Historical Events	Impact	10 Year Frequency	Vulnerability Rating
Flood	49	$7,685,000	2.7	High
Earthquake	0	0	0	Low
Tornado	4	$1,255,000	3.0	Moderate
Thunderstorm/Wind	122	$593,500	9.2	High
Landslide	1,251	> $4,229,694	310	High
Wildfire	496	13,258 Acres Burned	N/A	High
Severe Winter Storm	28	$3,200	1.9	Moderate
Drought	0	0	0	Low
Dam Failure	0	0	0	Low

[34] Historical Record from 1973-2014 (41 Years)

[35] For landslides, interpreted as number of events in 10 years, e.g. 1,226/41 = 30 events per year * 10 years = 300 events

Magoffin County - Salyersville

Hazard	Historical Events	Impact	10 Year Frequency	Vulnerability Rating
Flood	35	$5,358,000	1.5	High
Earthquake	0	0	0	Low
Tornado	2	$1,800,000	1.0	Moderate
Thunderstorm/Wind	83	$1,022,000	5.8	High
Landslide	547	No Data	140	High
Wildfire	796	23,904 Acres Burned	N/A	High
Severe Winter Storm	33		2.1	Moderate
Drought	0	0	0	Low
Dam Failure	0	0	0	Low

Martin County – Inez, Warfield

Hazard	Historical Events	Impact	10 Year Frequency	Vulnerability Rating
Flood	42	$7,135,000	2.2	High
Earthquake	0	0	0	Low
Tornado	1	$547,000	1.0	Moderate
Thunderstorm/Wind	69	$318,000	5.2	High
Landslide	917	No Data	230	High
Wildfire	565	24,597 Acres Burned	N/A	High
Severe Winter Storm	20	$2,000	1.3	Moderate
Drought	0	0	0	Low
Dam Failure	0	0	0	Low

4.4 ASSESSING VULNERABILITY: IDENTIFYING ASSETS

The planning committee prioritized fire departments, police stations, water/wastewater treatment plants, schools, select government buildings, senior centers, hospitals and any facility that may be deemed as a "shelter" to be critical infrastructure.

FLOYD COUNTY CRITICAL INFRASTRUCTURE

Fire Departments:

- Maytown, Wheelwright, Auxier, Middle Creek, Allen, Cow Creek, Toler Creek, David, Mud Creek, Betsy Layne, Southeast Floyd, Wayland, Garrett, Left Beaver, Martin, Prestonsburg/North Floyd, Floyd County Rescue Squad.

Schools:

- Elementary
    - Allen, Betsy Layne, Duff, John M. Stumbo, May Valley, McDowell, Osborne, Prestonsburg.
- Middle School
    - Adams, Allen Central.
- High School
    - Allen Central, Betsy Layne, South Floyd, Prestonsburg.
- College
    - BCTCS Campus.

Police:

- Floyd County Sheriff, Prestonsburg City Police.

Hospitals:

- Highlands Regional Medical Center, McDowell ARH, Saint Joseph Martin.

Senior Centers:

- Betsy Layne SCC, Martin SCC, McDowell SCC, Mud Creek SCC, Prestonsburg SCC, Wayland SCC, Wheelwright SCC.

Water Treatment Plants:

- Prestonsburg Water Treatment Plant, Francis Water Treatment Plant, Allen Water Treatment Plant, Wheelwright Water Treatment Plant.

PIKE COUNTY CRITICAL INFRASTRUCTURE

Fire Departments:

- Maytown, Island Creek, Coal Run Village, Rogers Park/Turkey Creek, Ferrells Creek, Belfry, Marrowbone, Greasy Creek, Hatfield, Shelby Valley, Gulnare, Phelps, Kimper, Blackberry, Grapevine, Sycamore, Hurricane Creek, Millard East Shelbiana, Upper Pond Creek, Johns Creek, Dorton, Feds Creek/Mouthcard.

Schools:

- Elementary
  - Bevins, Blackberry, Dorton, Elkhorn City, Feds Creek, Johns Creek, Kimper, Millard, Mullins, Northpoint, Phelps Day Treatment Center, Phelps, Shelby Valley Day Treatment Center, Southside, Pikeville.
- Middle School
  - Belfry, Valley.
- High School
  - Belfry, Eastridge, Phelps, Pike County Central, Shelby Valley, Pikeville
- College
  - BCTCS Campus, University of Pikeville.

Police:

- Pike County Sheriff, Pikeville City Police

Hospitals:

- Pikeville Medical Center, Williamson ARH.

Senior Centers:

- Elkhorn City SCC, Blackberry SCC, Belfry SCC, Kimper SCC, Marrowbone SCC, Phelps SCC, Pikeville SCC, Shelby Valley SCC

Water Treatment Plants:

- Pikeville Water Treatment Plant, Russell Fork Water Treatment Plant, Ratliff Family Water Treatment Plant.

JOHNSON COUNTY CRITICAL INFRASTRUCTURE

Fire Departments:

- Rockhouse, Van Lear, W.R. Castle, Williamsport, Red Bush, West Van Lear, Oil Springs, Thealka, Thelma, River, Flat Gap.

Schools:

- Elementary
  - Central, Flat Gap, Highland, Meade, Porter, W.R. Castle, Eagle Academy, Paintsville.
- Middle School
  - Johnson County Middle School
- High School
  - Johnson Central, Paintsville.
- College
- BCTCS Campus.

Police:
- Johnson County Sheriff, Paintsville Police.

Hospitals:
- Paul B. Hall Regional Medical Center.

Senior Centers:
- Johnson County SCC

Water Treatment Plants:
- Paintsville Water Treatment Plant

Other:
- Johnson County Health Department
- Paintsville City Hall/Johnson County Fiscal Court
- Johnson County/Paintsville EOC
- Johnson County/Paintsville Road Department
- Carl D. Perkins Rehab Center
- Wastewater treatment plants

MAGOFFIN COUNTY CRITICAL INFRASTRUCTURE

Fire Departments:
- North Magoffin, South Magoffin, Bloomington, District #3, Middle Fork, Magoffin County Rescue Squad.

Schools:
- Elementary
  - North Magoffin, South Magoffin, Salyersville, Magoffin County Headstart.
- Middle School
  - Herald Whitaker Middle School
- High School
  - Magoffin County High School, Magoffin County Adult Education Center, Magoffin County Career and Technical Center.
- College
  - N/A

Police:
- Magoffin County Sheriff, Salyersville Police.

Hospital:
- N/A

Senior Centers:
- Magoffin County SCC

Water Treatment Plant:
- Salyersville Water Treatment Plant

MARTIN COUNTY CRITICAL INFRASTRUCTURE

Fire Departments:
- Pigeon Roost, Turkey Creek, Warfield, Inez.

Schools:
- Elementary
  - Eden, Inez, Warfield, Martin County Headstart.
- Middle School
  - Martin County Middle School
- High School
  - Sheldon Clark, Martin County Adult Learning Center.
- College
  - N/A

Police:
- Martin County Sheriff, Inez Police.

Hospital:
- N/A

Senior Centers:
- Martin County SCC

Water Treatment Plant:
- Martin County Water Plant

FLOODING:

All five counties in the BSADD planning area have digitally mapped locations of addressed structures. The BSADD GIS staff could utilize this digital data along with the Q3 digital floodplain data to determine the number of structures in these counties that are located within the 100 year floodplain

The planning committees generated the list above of critical facilities and infrastructure to be inventoried and mapped for assessment of vulnerability. The critical facilities table in the following section includes both maps and a table listing schools, government facilities and public protection facilities as well as the number of each facility that are in a flood zone. Electrical transmission lines and natural gas pipelines were also considered to be critical infrastructure; however map data is not available for analysis. These two data sets were overlaid on hazard base maps to determine which facilities are located in vulnerable areas.

LANDSLIDE:

To determine the vulnerability to landslide hazard, slope and soil maps were used to determine areas that are prone to slipping. These data were subsequently overlaid onto the base maps of each county to determine what critical facilities and infrastructure are in landslide hazard areas. One of the most common effects of landslides on the BSADD region is the damage and destruction of roads. Using USGS digital elevation models and ArcGIS Spatial Analyst, a digital slope grid was created for each county. Areas with slope values greater than 60% were selected for the analysis as the area's most likely to slip. This layer of areas with slope greater than 60% was then analyzed spatially in relation to roads, critical facilities, and GPS generated structure points for each county. The results, illustrated on the associated maps, show points where roads, critical facilities, or structures are located within fifty feet of a slope greater than 60%.

TORNADO/SEVERE WIND

Predicting specific areas within a small region that are more susceptible to tornados is not possible due to the random nature at which they occur. A tornado could occur anywhere in the region, therefore all community assets are vulnerable.

SEVERE WINTER STORM

The nature of winter storms is that they occur over a large geographic area. Determining specific vulnerable areas within a region is not relevant to this hazard. All regional assets are vulnerable to this hazard.

WILDFIRE

Predicting specific areas that are more vulnerable to wildfire requires adequate information on fuel levels in the region. This data is not currently available in the BSADD region. Previous wildfire occurrences have been sporadic and located throughout the region with no discernable pattern. Based on the information currently available, a targeted analysis on specific areas within the region is not possible. Therefore until better data is available, wildfire will be considered a region-wide threat.

EARTHQUAKE

Each county in the Big Sandy Region has less than a [36]2% probability of an earthquake occurring with Pike County as the highest at 1.448% chance. This indicates that the entire region is at risk; however it's considered a minor risk at this point. Despite the low likelihood of the region experiencing earthquake damage it's also very difficult to narrow the threat of earthquake to specific hazard areas within the region should one occur. Therefore earthquake is considered a region-wide threat.

DROUGHT

Drought is a weather event that occurs region wide. Determining specific areas within the region that are more susceptible to drought or extreme heat is not applicable. However, the county mitigation planning committees determined that the primary threat to drought is the BSADD region's agricultural product and water supply.

DAM FAILURE

The threat of dam failure of disaster proportions within the BSADD region is primarily posed by the three large dams at Dewey Lake in Floyd County, Paintsville Lake in Johnson County, and the Fishtrap Dam located in Pike County. Included in the plan are a variety of coal slurry and other industrial impoundments that may cause disastrous environmental damage if released. The three large dams are closely monitored and maintained by the Army Corps of Engineers and are extremely unlikely to fail unless caused by some other disaster such as a major earthquake or an act of terrorism.

COUNTY STRUCTURES TABLES

County structure tables were not possible for the current plan update. Parcel data was deemed to not be reliable enough to consider adding to the plan. This detailed data is not currently available for any county in the Big Sandy Region, but will be included in this plan when it becomes available. A mitigation strategy to be included in this plan is the improvement of digital GIS mapping data including the mapping of structures for each county and adding a property class field to the data for each entity.

FUTURE BUILDINGS

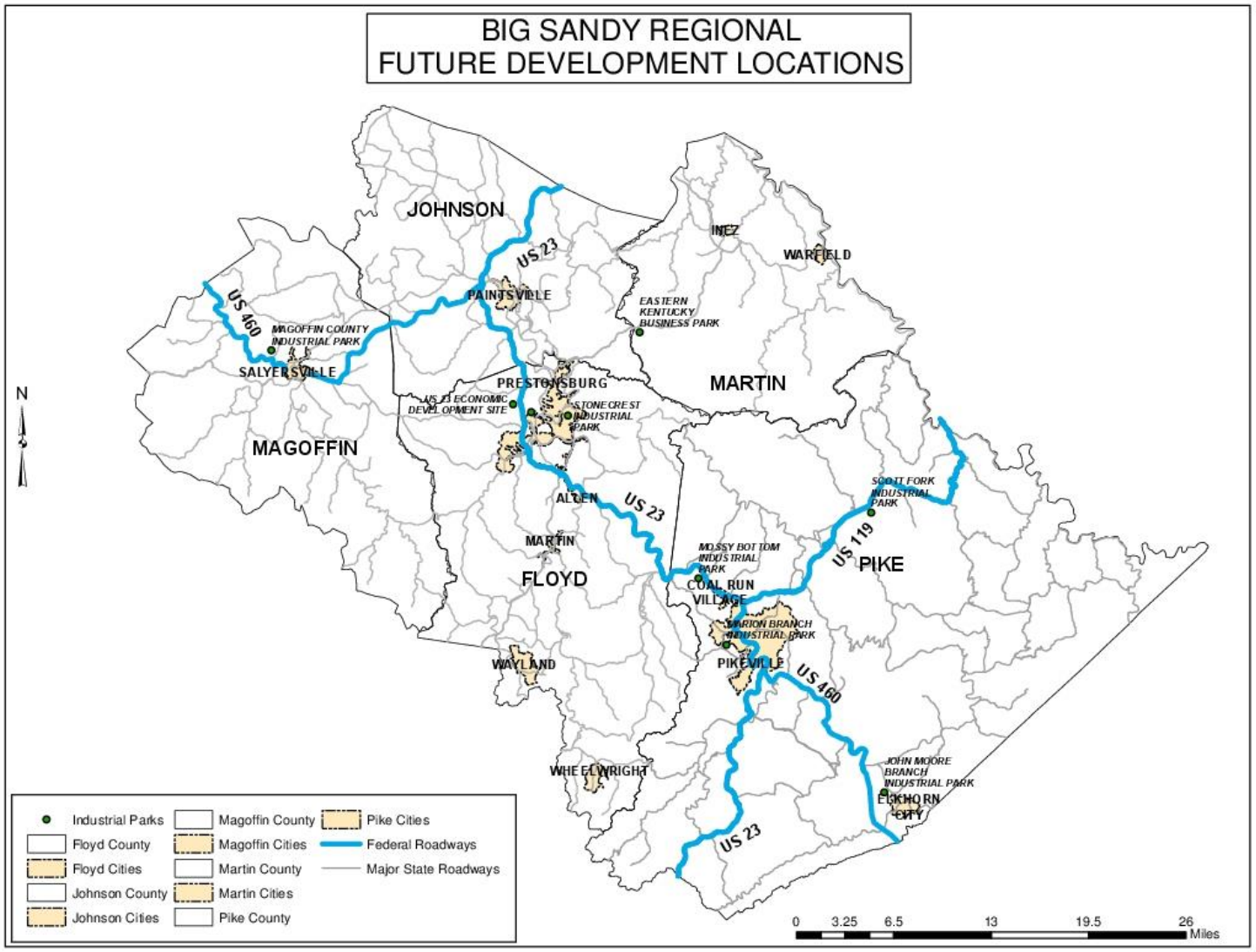
To analyze the number of future buildings, the committee looked at 2020 population projections and the median persons per household statistics were used to analyze the numbers of future households. The following table illustrates the results of this analysis.

COUNTY	PROJECTED POPULATION CHANGE	PERSONS PER HOUSEHOLD	PROJECTED RESIDENTIAL GROWTH (HOUSEHOLDS)
FLOYD	-1,284	2.33	-551
PIKE	-1,675	2.31	-725
JOHNSON	-111	2.35	-47
MAGOFFIN	+91	2.36	+39

[36] http://www.homefacts.com/earthquakes/Kentucky.html

MARTIN	-449	2.35	-191

This analysis indicates that Floyd, Pike, Johnson and Martin will likely see a decrease in construction of new residential structures due to the predicted loss of population, with only Magoffin seeing a very minor increase in population by 2020. Any new structures that would be needed would be planned outside of the identified hazard boundaries.



The above map illustrates the major development areas in the Big Sandy Region. Illustrated in the map are the locations of all of the industrial parks located within the five county region. Should development occur within the region the most likely locations would be inside the industrial parks or along the major highways and interstates shown above.

4.5 Assessing Vulnerability: Estimating Potential Losses

This section uses the best available data to describe the BSADD's planning area and its vulnerability to each identified hazard in terms of an estimate of the potential dollar losses and a description of the methodology used. GIS based information is not consistent from one community to the next and in the Big Sandy region specifically, tends to be unreliable at this point. The collection of GIS data is included as a hazard mitigation project and future updates of the plan may have additional GIS based on data available. Several of the hazards that affect the Big Sandy region, including tornados/severe thunderstorm wind, severe winter storms, wildfire, and earthquake have no defined vulnerable areas due to either data limitations or to the nature of the hazard. These hazards are a general threat to the entire planning area. As a result all community assets are at risk to these hazards. To assess the region-wide potential losses from natural hazards, several data sources were attempted for analysis and utilized.

The current data being used in this plan is data analyzed and gathered from the 2011 plan update via Hazus. The GIS department at the Big Sandy Area Development District was unfamiliar with Hazus software at this point and unable to obtain proper training within a reasonable timeframe. Multiple attempts were made seeking help on running the software to aid in this section of the plan and all were unsuccessful. Attempts were made to contact the state level offices as well as 3 other ADD districts to seek help. In all attempts the ADD districts either did not use Hazus or were unfamiliar themselves in how to use the software. Due to the unreliability of the local parcel data the Mitigation Committee felt it was best to not use that data and utilize the Hazus data from 2011 as it was the most reliable and accurate data available until new data can be generated and analyzed. A major project and goal for the Big Sandy Region is that all 5 counties improve their parcel data by the next plan update. If the parcel data can be improved then the data for the following tables will represent more accurate numbers and there will be less dependency placed on utilizing the Hazus software.

REGION-WIDE HAZARDS

The figures in the first table represent an aggregate estimate of the dollar amount replacement costs of all facilities and infrastructure combined exposed to region-wide hazards. A data limitation is that this figure does not include figures for exposed road segments. The second column of the table displays the general building stock total exposure for each county with the Critical Facilities and Infrastructure figures subtracted.

Potential Dollar Losses From Each Hazard						
Entity	**Flood**	**Landslide**	**Tornadoes**	**Severe Wind /Storm**	**Severe Winter Storm**	**Wildfire**
Floyd	$952,964,000	$1,690,321,000	$1,690,321,000	$1,690,321,000	Not Available	$21,579,852
Pike	$1,770,494.978	$2,673,441,700	$2,673,441,700	$2,673,441,700	Not Available	$43,104,934
Johnson	$497,981,900	$845,535,200	$845,535,200	$845,535,200	Not Available	$14,295,283
Magoffin	$89,385,675	$389,568,200	$389,568,200	$389,568,200	Not Available	$16,924,300
Martin	$293,649,693	$425,073,100	$425,073,100	$425,073,100	Not Available	$12,597,376

FLOODING

To determine potential losses due to flooding, the same data sources as above were employed, but limited to the critical facilities, infrastructure, and exposed building stock that are located within a mapped floodplain, or one of the flood hazard areas that were mapped based on knowledge of past flooding events. Information was compiled first from the Hazus flood model information for each jurisdiction, then supplemented with local official and jurisdiction personnel input as to the susceptibility of critical facilities to each type of hazard, The information in all tables includes all of the incorporated cities in each county.

County	Exposed Critical Facilities and Infrastructure	All Other Exposed Building Stock
Floyd	$476,482	$952,964,000
Pike	$885,247	$1,770,494.978
Johnson	$248,990	$497,981,900
Magoffin	$44,692	$89,385,675
Martin	$146,824	$293,649,693

LANDSLIDE

To determine potential losses due to landslide, the same data sources as above were employed, but limited to the critical facilities, infrastructure, and exposed building stock that are located within a mapped floodplain, or one of the flood hazard areas that were mapped based on knowledge of past flooding events. Information was compiled first from Hazus for each jurisdiction, and then supplemented with local official and jurisdiction personnel input as to the susceptibility of critical facilities to each type of hazard; the information in all tables includes all of the incorporated cities in each county.

County	Exposed Critical Facilities and Infrastructure	All Other Exposed Building Stock
Floyd	$1,690,321,000	$952,964,000
Pike	$2,673,441,700	$1,770,494.978
Johnson	$845,535,200	$497,981,900

Magoffin	$389,568,200	$89,385,675
Martin	$425,073,100	$293,649,693

Road segments are not included in the dollar amounts

DAM FAILURE

An analysis on the potential losses due to dam failure is not possible without digital inundation mapping to determine what areas would be vulnerable to such an event. The Army Corps of Engineers were involved with the development of this plan and when data becomes available, potential losses due to dam failure will be included in future updates of this plan.

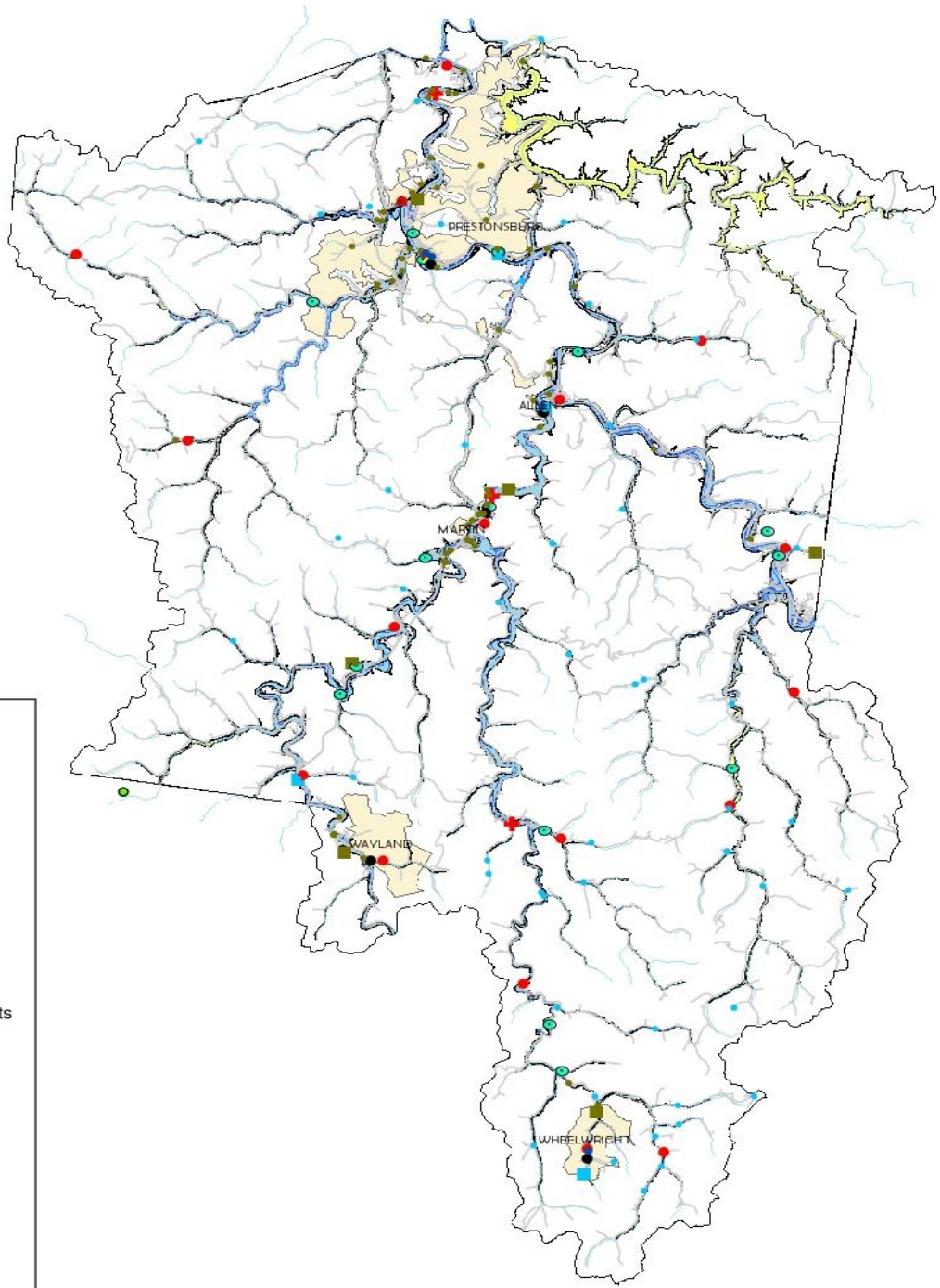
DROUGHT

The primary threat that drought poses, is on the region's agricultural production, a limitation to this analysis is that data are only available at county level.

[37]County	Agricultural Product
Floyd	$578,000
Pike	$560,840
Johnson	$1,286,152
Magoffin	$1,256,641
Martin	$95,440
Regional Value	$3,777,073

[37] Data taken from the USDA Census of Agriculture 2012 report: http://www.agcensus.usda.gov/Publications/2012/Full_Report/Census_by_State/Kentucky/

FLOYD COUNTY
CRITICAL FACILITIES - FLOOD



N

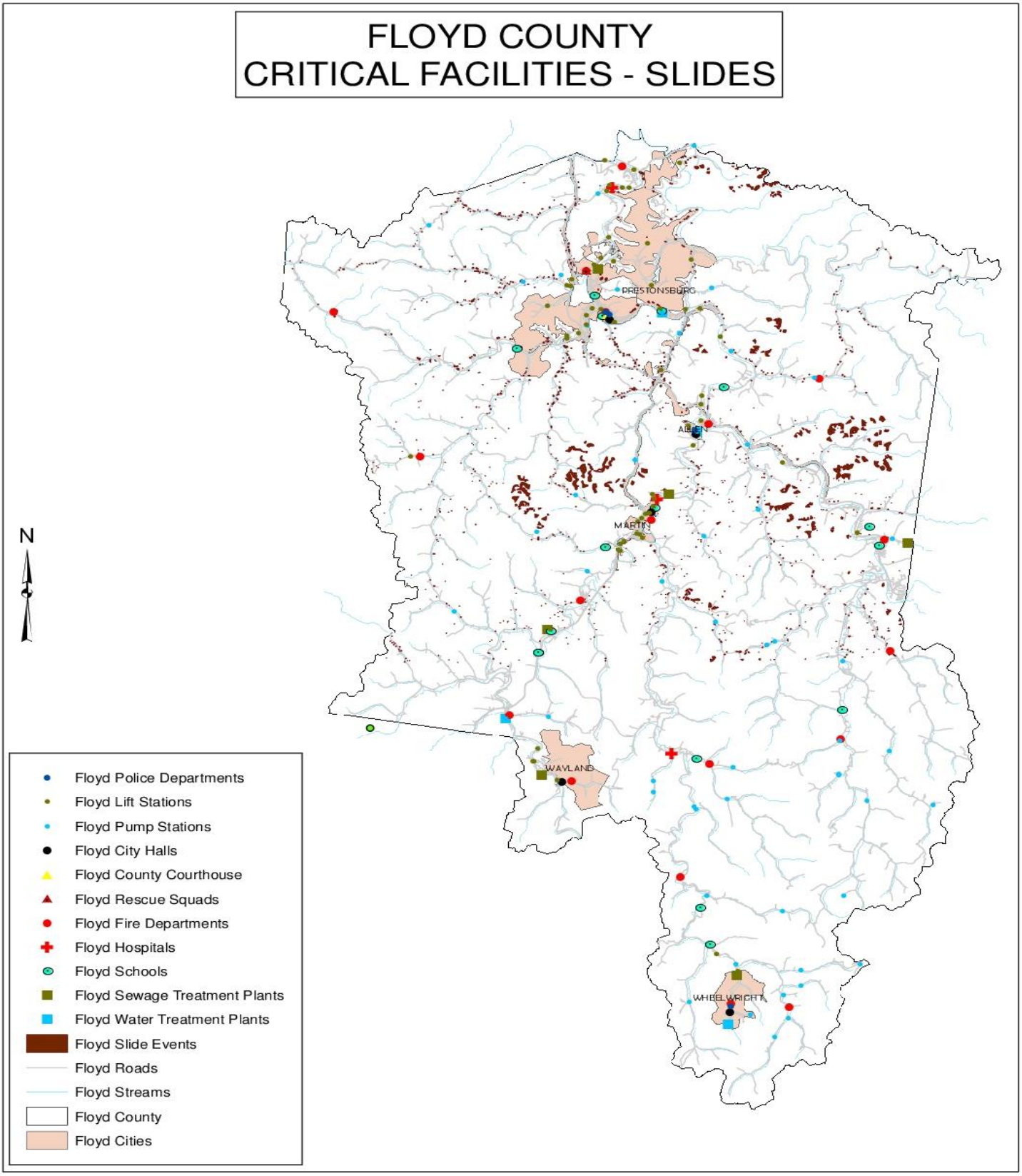
- Floyd Police Departments
- Floyd Lift Stations
- Floyd Pump Stations
- Floyd City Halls
- Floyd County Courthouse
- Floyd Rescue Squads
- Floyd Fire Departments
- Floyd Hospitals
- Floyd Schools
- Floyd Sewage Treatment Plants
- Floyd Water Treatment Plants
- Floyd Roads
- Floyd Streams

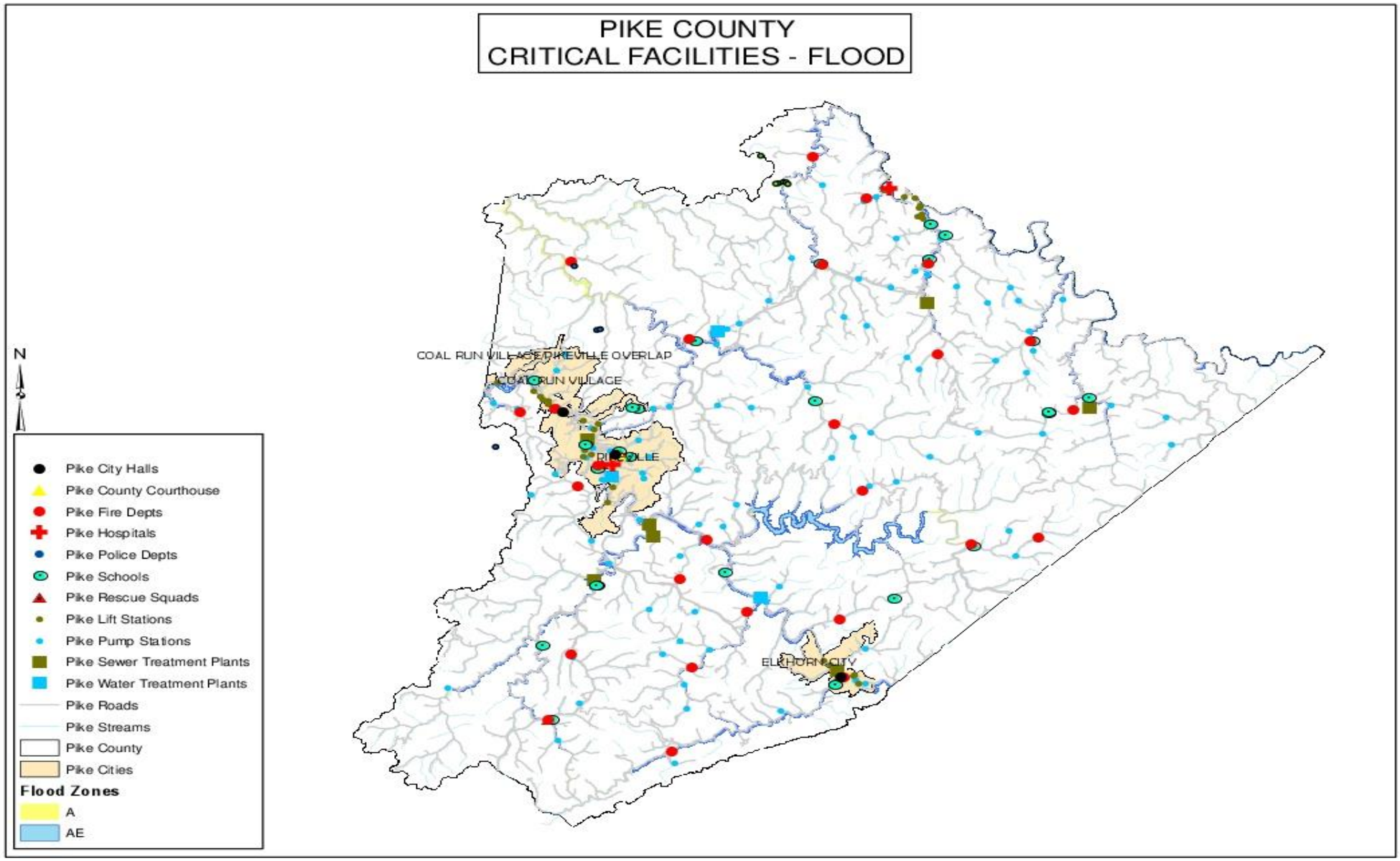
Floyd Flood Hazard Areas

Flood Zones

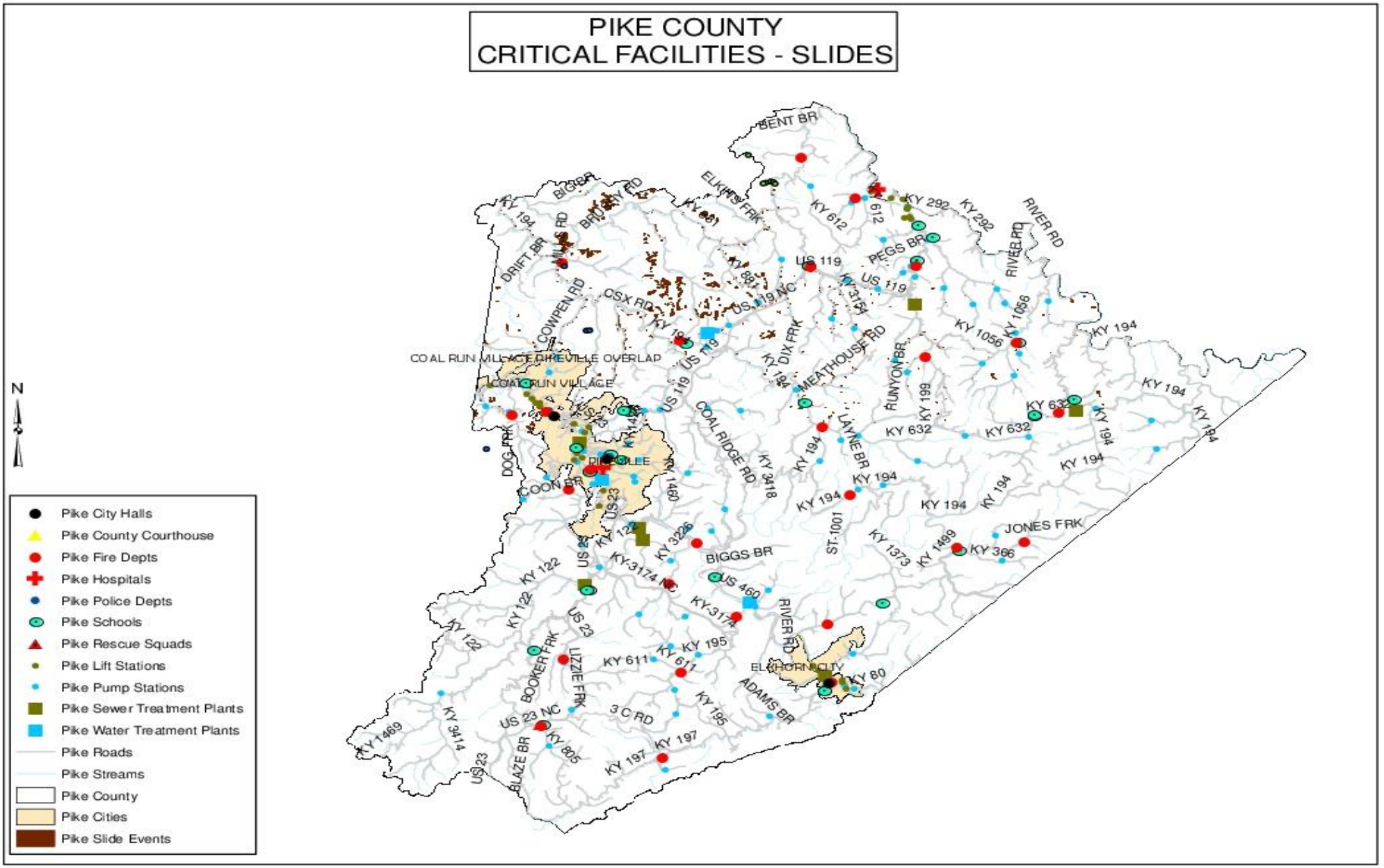
- A
- AE
- X
- Floyd County
- Floyd Cities

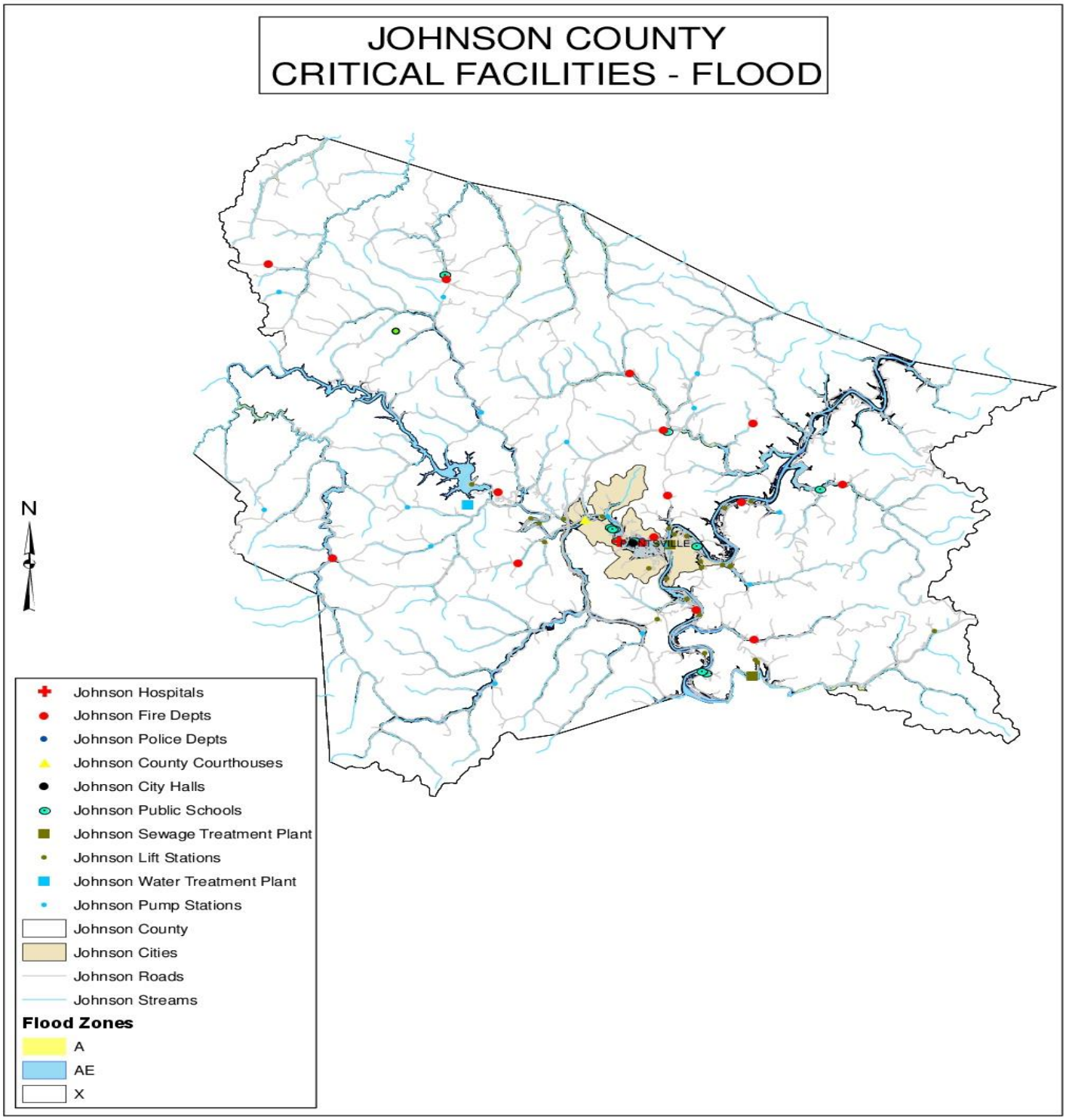
FLOYD COUNTY
CRITICAL FACILITIES - SLIDES



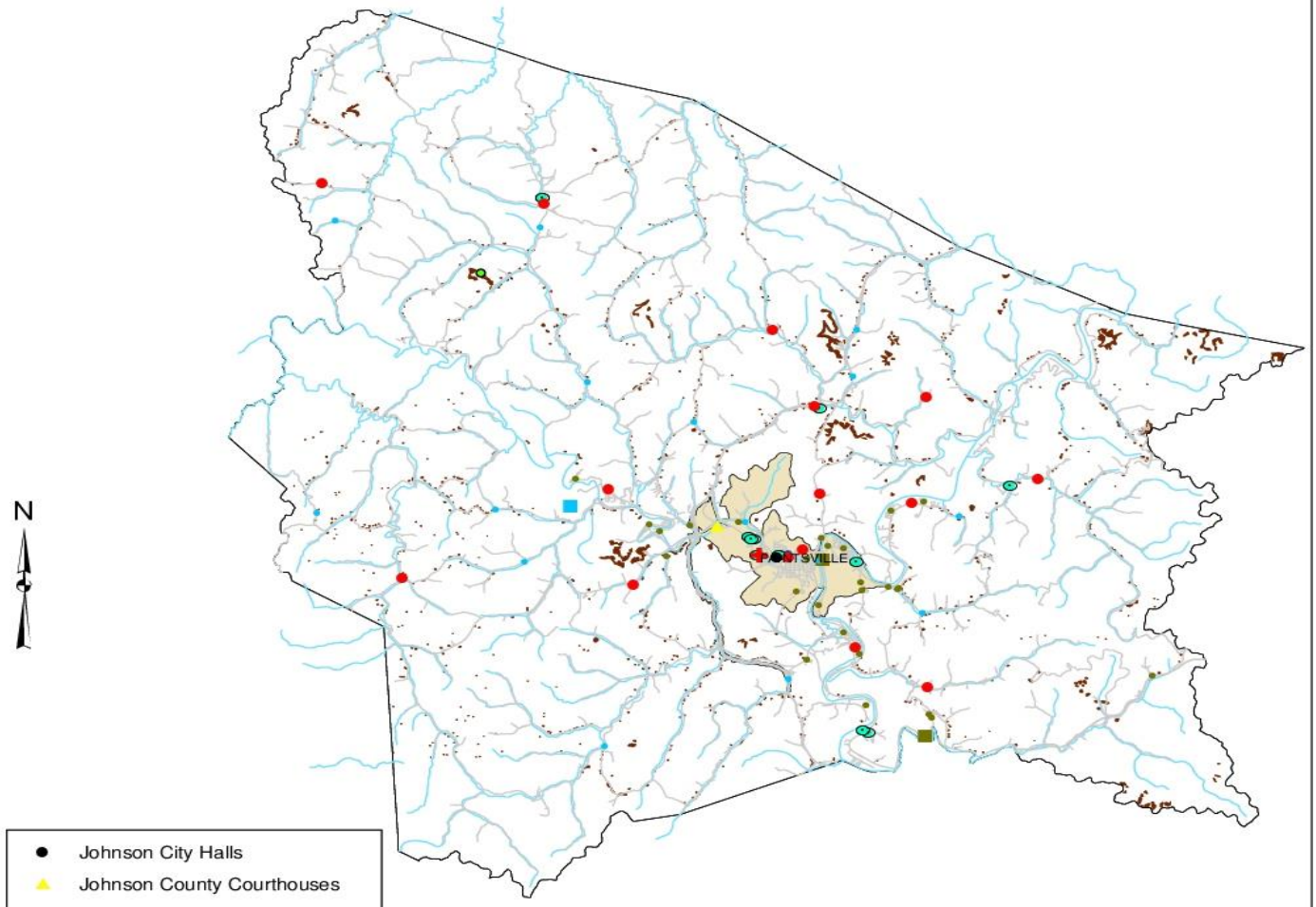

PIKE COUNTY
CRITICAL FACILITIES - FLOOD
N
COAL RUN VILLAGE/PIKEVILLE OVERLAP
COAL RUN VILLAGE
PIKEVILLE
ELKHORN CITY
Pike City Halls
Pike County Courthouse
Pike Fire Depts
Pike Hospitals
Pike Police Depts
Pike Schools
Pike Rescue Squads
Pike Lift Stations
Pike Pump Stations
Pike Sewer Treatment Plants
Pike Water Treatment Plants
Pike Roads
Pike Streams
Pike County
Pike Cities
Flood Zones
A
AE

PIKE COUNTY
CRITICAL FACILITIES - SLIDES

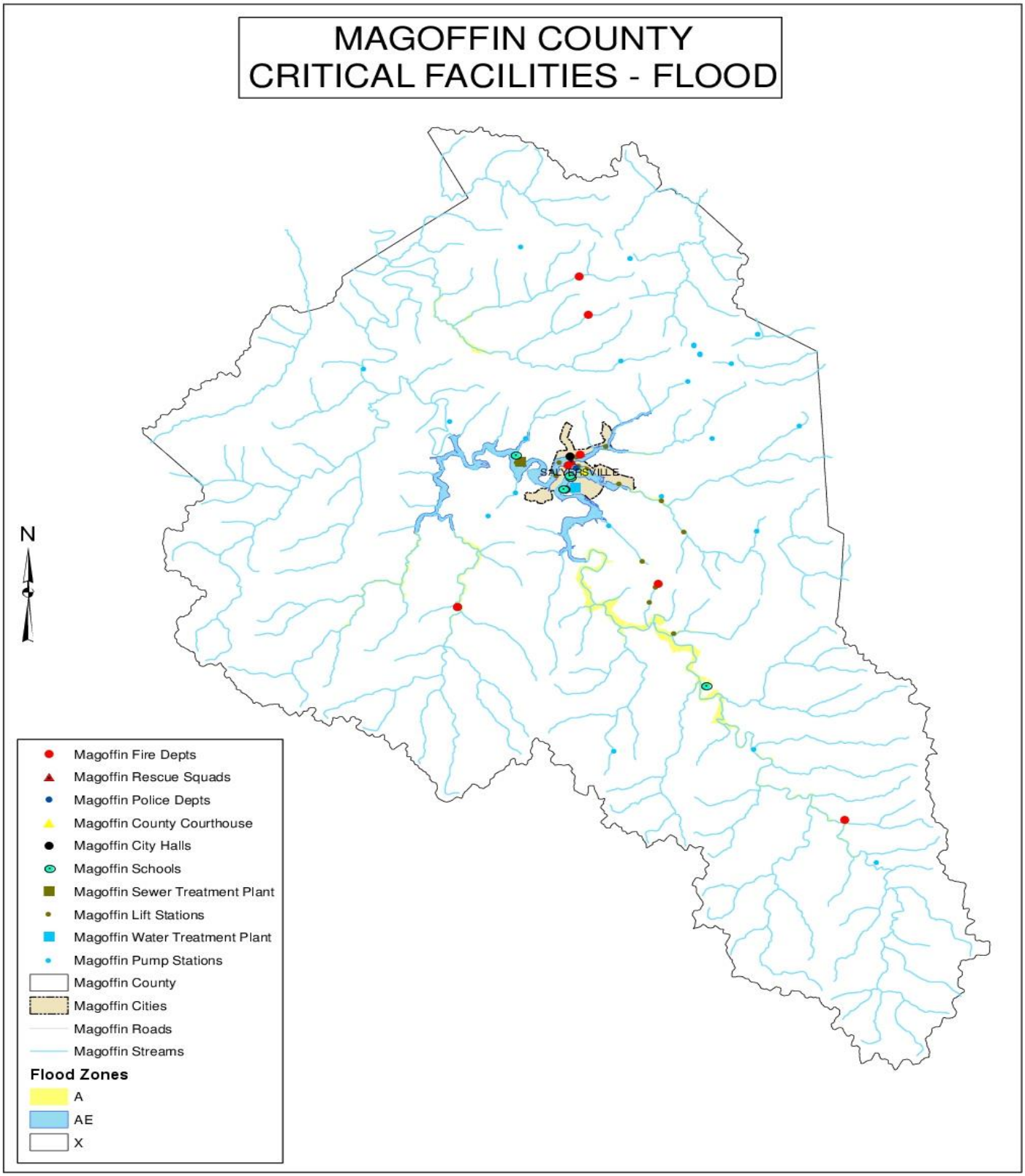



JOHNSON COUNTY
CRITICAL FACILITIES - FLOOD
N
Johnson Hospitals
Johnson Fire Depts
Johnson Police Depts
Johnson County Courthouses
Johnson City Halls
Johnson Public Schools
Johnson Sewage Treatment Plant
Johnson Lift Stations
Johnson Water Treatment Plant
Johnson Pump Stations
Johnson County
Johnson Cities
Johnson Roads
Johnson Streams
Flood Zones
A
AE
X

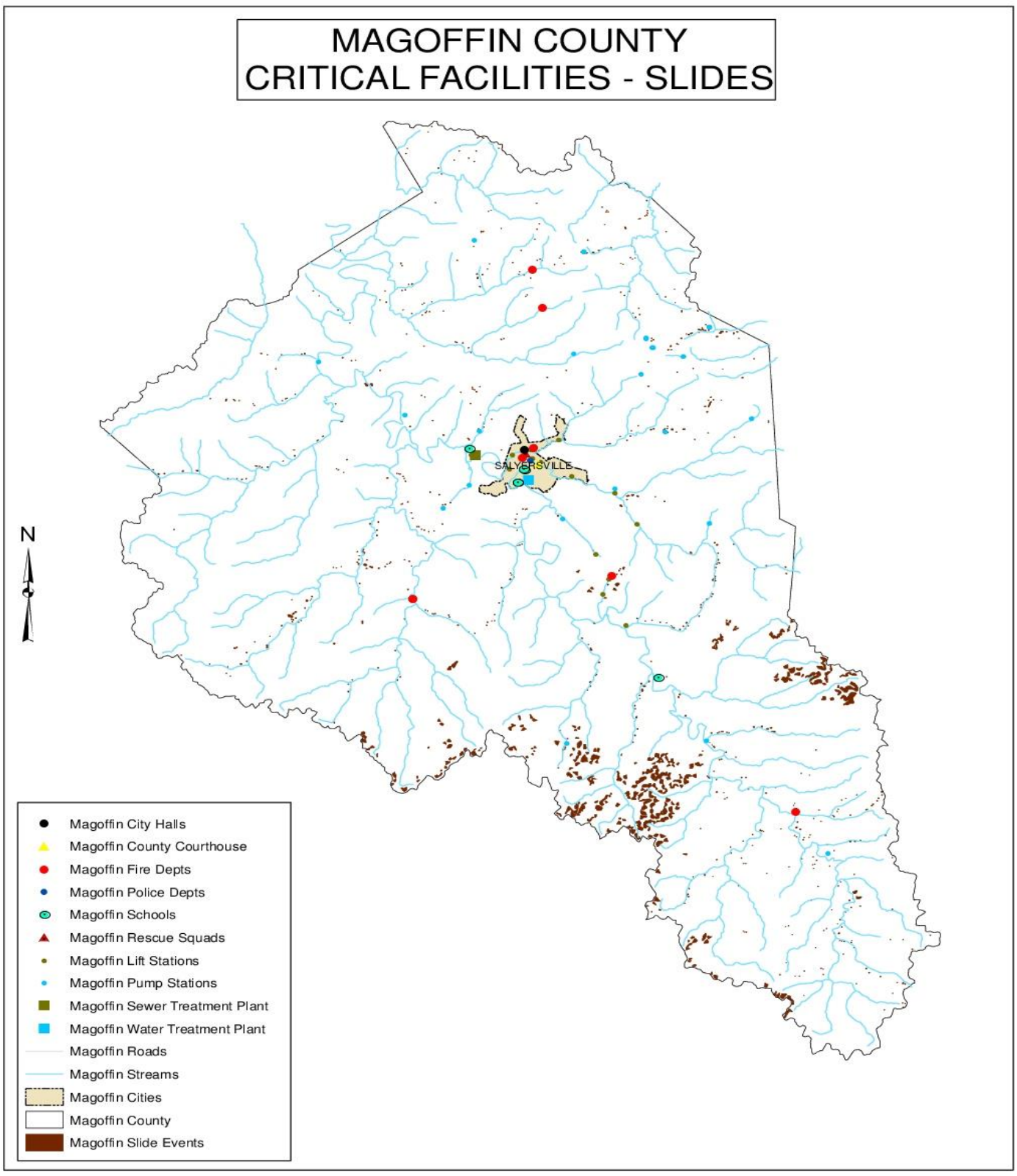
JOHNSON COUNTY
CRITICAL FACILITIES - SLIDES

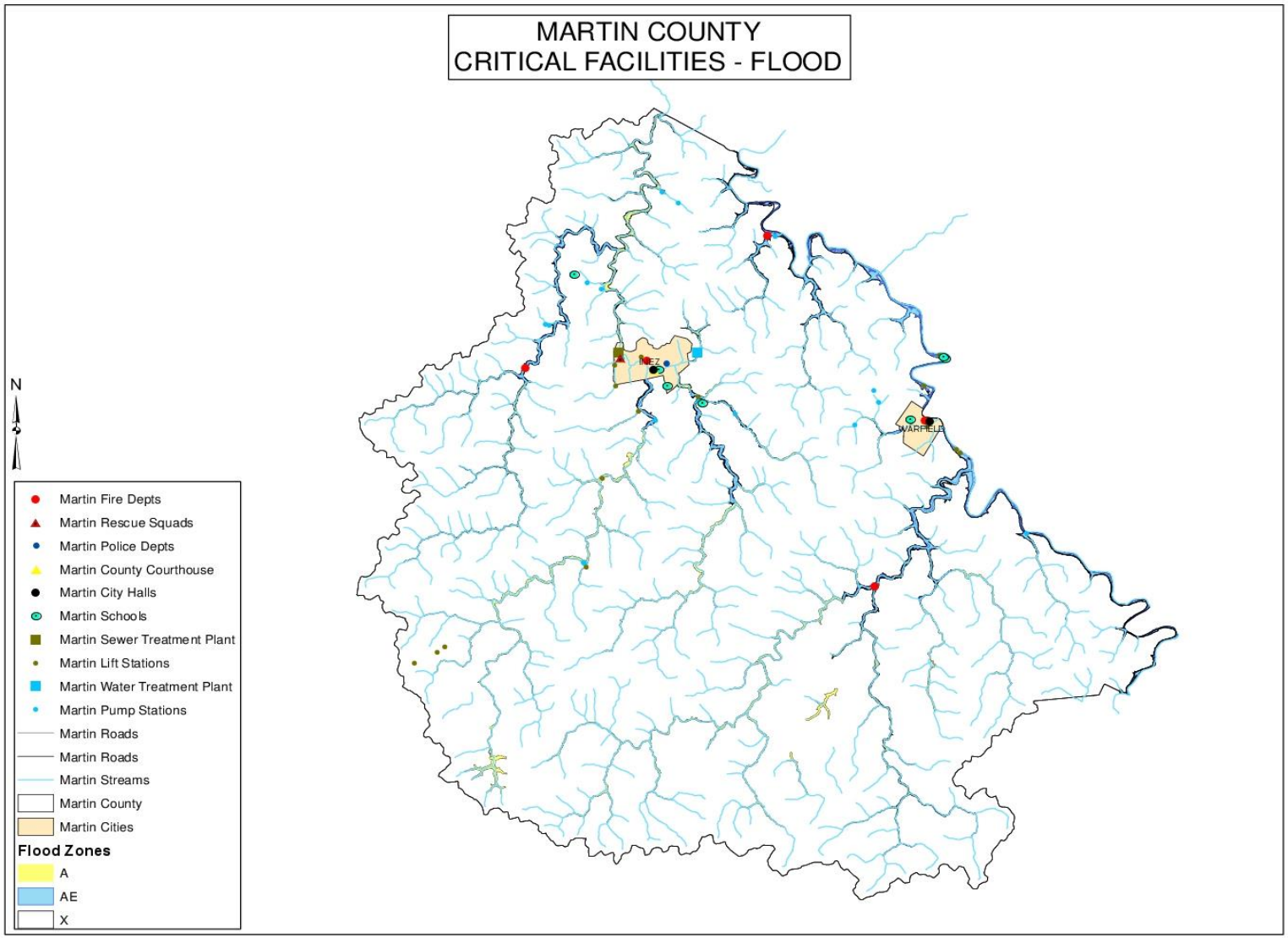


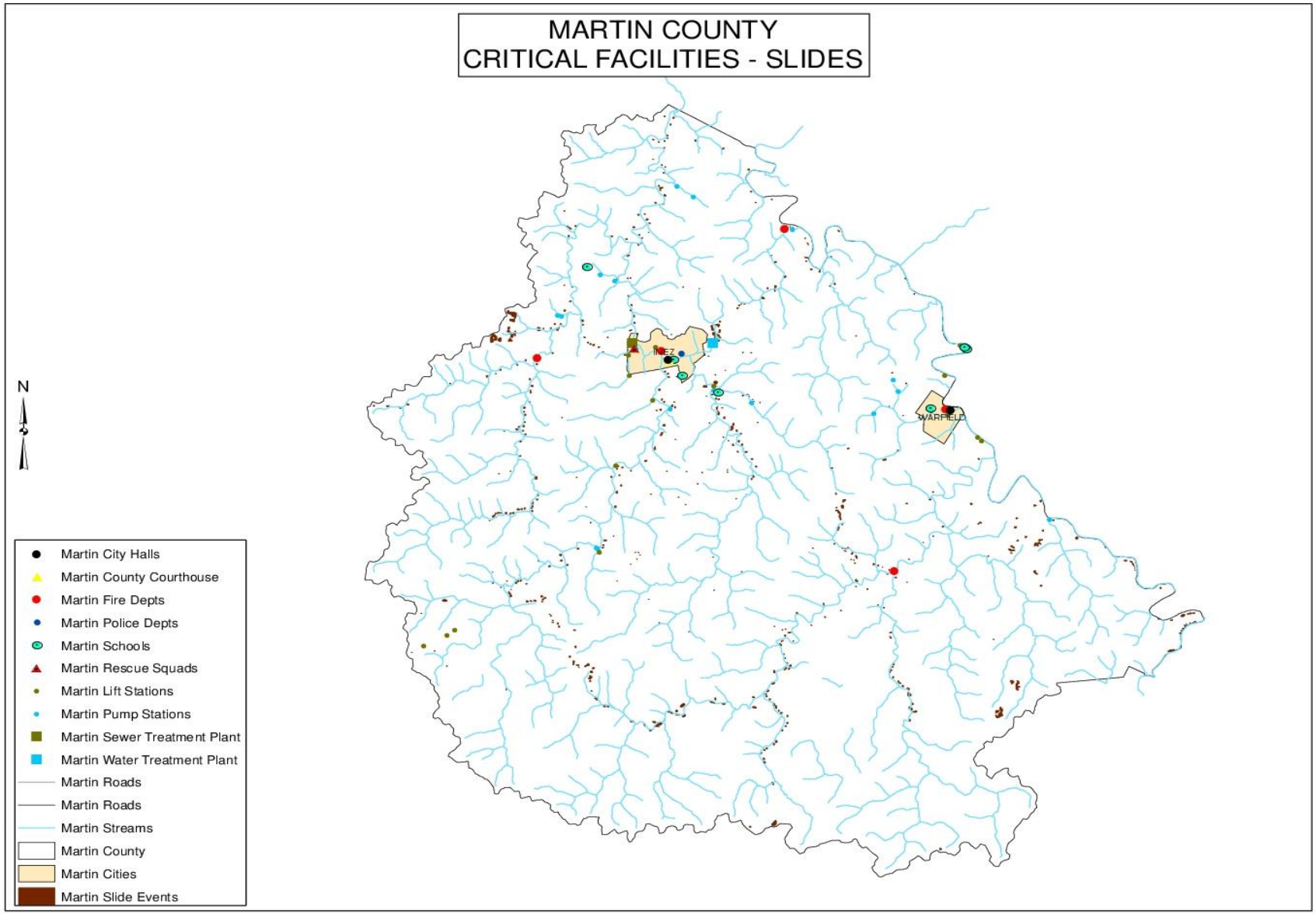
MAGOFFIN COUNTY
CRITICAL FACILITIES - FLOOD



MAGOFFIN COUNTY
CRITICAL FACILITIES - SLIDES




MARTIN COUNTY
CRITICAL FACILITIES - FLOOD
N
WARFIELD
Martin Fire Depts
Martin Rescue Squads
Martin Police Depts
Martin County Courthouse
Martin City Halls
Martin Schools
Martin Sewer Treatment Plant
Martin Lift Stations
Martin Water Treatment Plant
Martin Pump Stations
Martin Roads
Martin Roads
Martin Streams
Martin County
Martin Cities
Flood Zones
A
AE
X


MARTIN COUNTY
CRITICAL FACILITIES - SLIDES
N
WARFIELD
Martin City Halls
Martin County Courthouse
Martin Fire Depts
Martin Police Depts
Martin Schools
Martin Rescue Squads
Martin Lift Stations
Martin Pump Stations
Martin Sewer Treatment Plant
Martin Water Treatment Plant
Martin Roads
Martin Roads
Martin Streams
Martin County
Martin Cities
Martin Slide Events

FLOODING AND CRITICAL FACILITIES IN THE BIG SANDY REGION				
COUNTY	FACILITY	NUMBER OF FACILITIES	NUMBER OF FACILITIES IN FLOOD ZONE	% OF FACILITIES SUSCEPTIBLE TO FLOODING
FLOYD	HOSPITALS	3	0	0%
	FIRE DEPT.	18	6	33%
	RESCUE SQUADS	1	0	0%
	POLICE DEPT.	4	1	25%
	COURT HOUSE	1	0	0%
	CITY HALL	5	1	20%
	SCHOOL	16	3	19%
	SEWER TREATMENT PLANT	6	0	0%
	LIFT STATION	61	32	52%
	WATER TREATMENT PLANT	4	1	25%
	PUMP STATIONS	54	10	19%
PIKE	HOSPITALS	2	0	0%
	FIRE DEPT.	27	1	4%
	RESCUE SQUADS	2	0	0%
	POLICE DEPT.	5	1	20%
	COURT HOUSE	1	0	0%
	CITY HALL	3	0	0%
	SCHOOL	25	6	24%
	SEWER TREATMENT PLANT	7	1	14%
	LIFT STATION	36	19	53%
	WATER TREATMENT PLANT	3	1	33%
	PUMP STATIONS	97	21	22%
JOHNSON	HOSPITALS	1	0	0%
	FIRE DEPT.	15	5	33%
	RESCUE SQUADS	0	0	0%
	POLICE DEPT.	2	2	100%
	COURT HOUSE	1	1	100%
	CITY HALL	1	0	0%
	SCHOOL	14	6	43%
	SEWER TREATMENT PLANT	2	0	0%
	LIFT STATION	28	15	54%
	WATER TREATMENT PLANT	1	0	0%
	PUMP STATIONS	16	5	31%
MAGOFFIN	HOSPITALS	0	0	0%
	FIRE DEPT.	8	1	13%
	RESCUE SQUADS	1	1	100%
	POLICE DEPT.	2	1	50%
	COURT HOUSE	1	1	100%
	CITY HALL	1	0	0%
	SCHOOL	6	4	67%
	SEWER TREATMENT PLANT	1	0	0%
	LIFT STATION	14	6	43%
	WATER TREATMENT PLANT	1	0	0%
	PUMP STATIONS	26	1	4%

FLOODING AND CRITICAL FACILITIES IN THE BIG SANDY REGION				
COUNTY	FACILITY	NUMBER OF FACILITIES	NUMBER OF FACILITIES IN FLOOD ZONE	% OF FACILITIES SUSCEPTIBLE TO FLOODING
MARTIN	HOSPITALS	0	0	0%
	FIRE DEPT.	5	3	60%
	RESCUE SQUADS	1	1	100%
	POLICE DEPT.	2	0	0%
	COURT HOUSE	1	0	0%
	CITY HALL	2	0	0%
	SCHOOL	7	1	14%
	SEWER TREATMENT PLANT	1	0	0%
	LIFT STATION	18	7	39%
	WATER TREATMENT PLANT	1	0	0%
	PUMP STATIONS	18	2	11%
TOTALS		**579**	**167**	**29%**

4.6 ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

This section of the Risk Assessment addresses the development trends and land uses within the BSADD region in relation to the hazards being addressed in this plan. This analysis utilizes existing land use plans in the jurisdictions in which they exist, as well as data from the U.S. Census Bureau, the Kentucky State Data Center, and GIS data from the Kentucky Landscape Snapshot land cover data set. Another important source of information is knowledge of future development locations from the members of the planning committees.

The 2010 census estimates the BSADD's overall population at 154,093; that is a 4% decline from 2000's figures of 160,532. Floyd County has seen the largest downsizing from the 2000 census. Floyd County has lost 7% of its population falling to 39,451, down from 42,441 a decade earlier. Pike County has not fared much better losing 5.4% of their population during the same span. Both Johnson and Magoffin County have relatively maintained their population over the last decade and only Martin County has seen its population increase over the decade, adding 2.6% to its population.

	U.S.	KY	Regional	Floyd	Pike	Johnson	Magoffin	Martin
Population 2010	309,415,591	4,339,367	154,093	39,451	65,024	23,356	13,333	12,929
Population 2000	281,421,906	4,041,769	160,532	42,441	68,736	23,445	13,332	12,578
Population % Change, 2000-2010	+9.94%	+7.40%	-4%	-7%	-5.4%	-0.39%	0%	+2.6%

[38]Population estimates for 2015 continue to illustrate a decrease in population for the region as estimates for the 5 county Big Sandy Region show the current population at 151,480 which is a decrease of 1.7% for the region in only 5 years. The projections for 2020 continue to show the trend of a population decrease for the region. 2020 projections for the 5 counties are at 148,051, a 3.9% decrease from the 2010 data. Projections for 2030 show the population at 138,745, a decrease of 10% of the 2010 population. 2040 projections estimate a 17.2% decrease in the population and 2050 projections illustrate a staggering decrease of 24.2% of the 2010 population. County projections obviously follow the same trend as the regional projections although some counties are projected to lose population more significantly than others.

Population Projections by County

Year	Floyd	Pike	Johnson	Magoffin	Martin	2015 Change
2015 Estimates	38,438	63,666	23,376	13,496	12,504	N/A
2020 Projections	37,154	61,991	23,265	13,587	12,055	-3,408
2030 Projections	34,001	57,679	22,605	13,469	10,991	-12,735

[38] Population projection data taken from a 2011 report from Kentucky State Data Center, University of Louisville.

2040 Projections	30,618	52,681	21,533	12,967	9,801	-23,880
2050 Projections	27,400	47,928	20,438	12,321	8,665	-34,728
Total Projected Loss by 2050	**-11,038**	**-15,738**	**-2,938**	**-1,175**	**-3,839**	
% of Pop. Lost by 2050	**-28.7%**	**-24.7%**	**-12.6%**	**-8.7%**	**-30.7%**	

Development in the region continues to be a focal point for all entities in the 5 county region. The desire is that the region will be in a competitive position to attract businesses and retain residents with expanded opportunities for earning a good living in Eastern Kentucky. Critical components for development and growth include basic infrastructure, housing options, and recreation. Economic development focus areas are centered upon the region's primary sectors: energy, healthcare, and tourism as well as workforce development activities that will prepare individuals for today's job requirements. Limited resources at all levels will continue to require new approaches for planning, funding, and implementing projects in the absence of grant funds.

For continued community development and economic growth the region needs to build upon its progress, generate greater long- range accomplishments and economic growth in the future. It remains imperative that the region is successful in its efforts, particularly given the fact that local, state and federal funding continues to be difficult to obtain. Local governments in the region are attempting to balance budgets, maintain services, and consider generation of additional revenue in order to advance the region's economy. Many have undertaken or are in the process of community planning activities that will result in a more strategic focus on the future. It is also the hope that through the District's strategic planning a more efficient utilization of resources and funding as well as more cost effective development will occur.
The economic indicators and performance measures used to evaluate the District's progress demonstrate that much work remains to be done and until the action plans are fully implemented, we expect to show meager progress. Never before have we seen, however, have a more collaborative mindset and focus on facilitating changed for the region's benefit. The Shaping Our Appalachian Region (SOAR) initiative has sparked change and a greater collaborative spirit among multiple stakeholders. The District's Community and Economic Development Strategy are aligned with the focus areas identified by SOAR and the region.

Major development areas within the region still remain for the most part in close proximity to the area's cities. The area in and around the City of Prestonsburg and US23 in Floyd County continues to see growth and development. In 2011, Preston Crossing Housing complex was opened. The Harold to Minnie Connector Road (KY 680) opened a 2.5 mile section in 2010 and received $60 million dollars in funding to continue work on the remaining sections. Floyd County has seen the most growth on US 23 in and around the community of Harold. Floyd County continues working toward continued development of a Wastewater Treatment Plant for the residences and businesses in this area of the county. Phase I and II of the Harold Sewer Project have been completed recently and currently the project is beginning phase III to provide waste water treatment for the Harold area along U.S. 23.

Sections of development are ongoing in and around the City of Paintsville in Johnson County. These developments include a medical office building and a school cafeteria for the Paintsville Independent School District. Construction has been completed on the Paintsville Lake Water Treatment plant as well as infrastructure improvements for the local water and wastewater facilities. Continued development in many of our rural areas is linked to infrastructure improvements being made to allow such growth to occur.

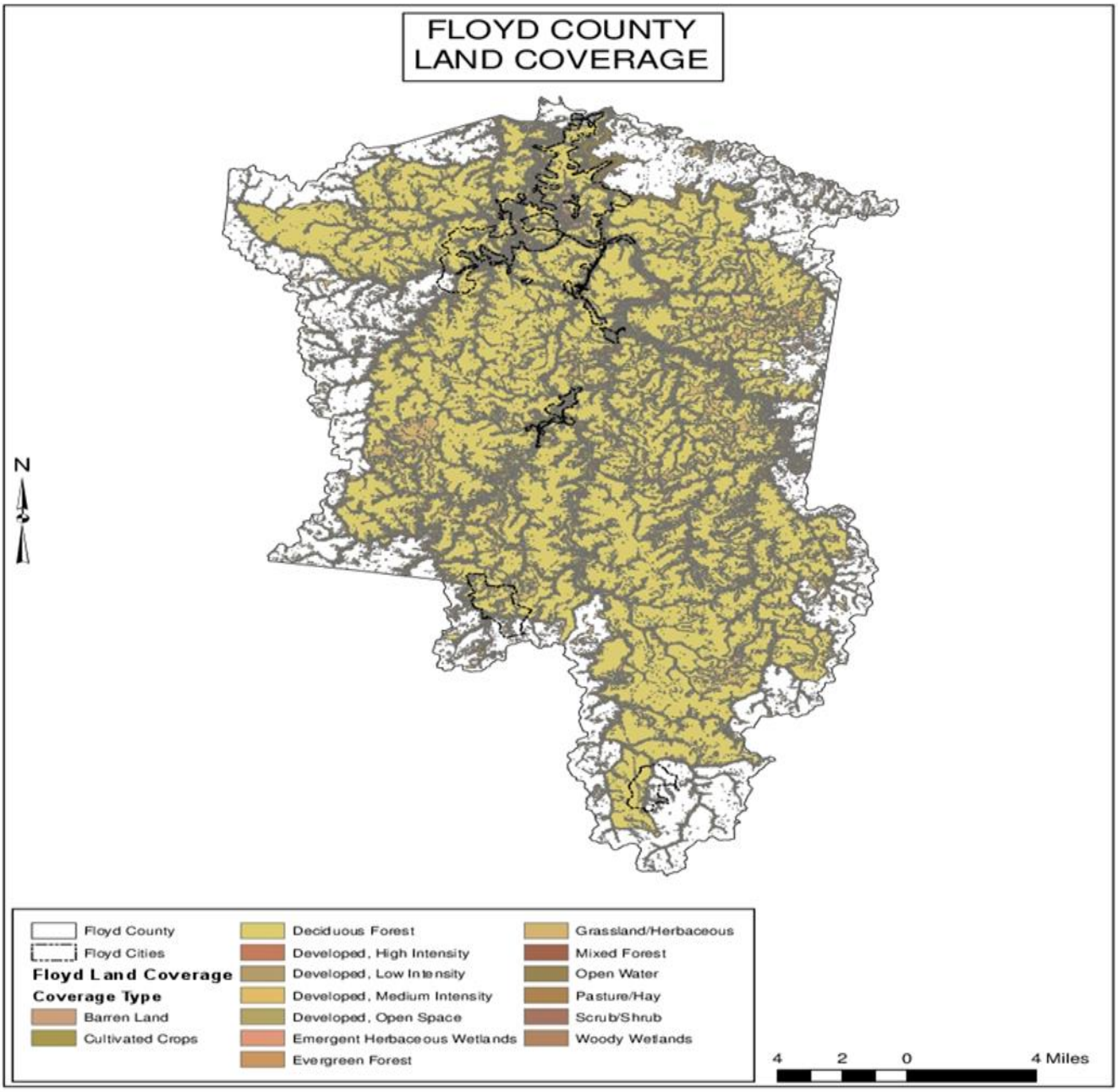
Sections of development in and around Salyersville in Magoffin County include the Salyersville and Dixie Water projects and the recently constructed Magoffin County Health Department. In 2014 Magoffin County also began construction on a new High School and new football field on US 460 that is expected to be complete in 2016 as well as an economic development site located near Gifford in Magoffin County. The economic development site will coincide with the construction and expansion of the Bert T. Combs Parkway and the addition of on and off ramps being constructed near the location.

The City of Inez in Martin County continues to grow at a slower pace, as does the county. Construction is nearing completion on the Tug Valley/Warfield Wastewater project along with the RT. 645 expansion Project. The RT. 3 overpass improvement project was completed in 2010. Martin County has also seen the construction of a brand new court house, located adjacent to their current building in Inez. Construction on the courthouse was completed in the fall of 2015 and will provide the county with much needed improvements for their daily duties.

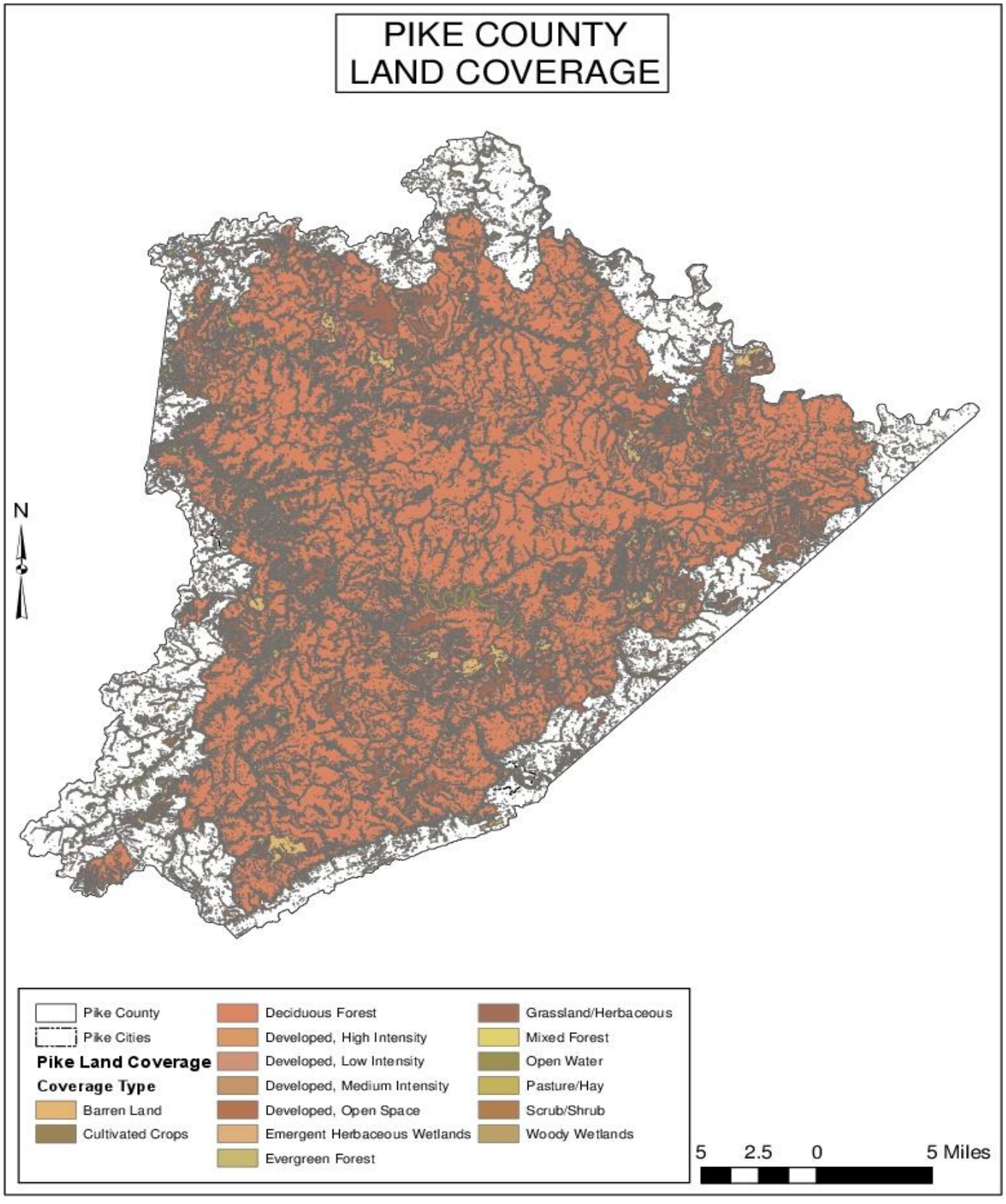
Pike County and the City of Pikeville are seeing the most growth within the region. Road projects such as the US 460 expansion and US 119 expansion will lead to growth and the opening up of the region. The Pike County Airport Road project connecting the Airport Road to the Lower Johns Creek opened up access to the airport to the residents of Lower Johns Creek. In January of 2011, ground was broken on the final section of the US 119 project. The Pikeville Medical Center has constructed a parking structure and performed other various improvements. In 2011 the Pikeville Medical Center partnered with the Cleveland Clinic to offer residents inside and outside the region state of the art cardiac care. Various infrastructure projects have been completed or are in construction in the region that include both water and waste water projects. Pike County has also seen the construction of a new courthouse in downtown Pikeville. Construction on the courthouse was completed in 2014 and has provided a much needed improvement for the county. The University Of Pikeville School Of Osteopathic Medicine underwent an expansion; the project was completed in 2014. A new hotel has also been constructed in the downtown Pikeville area next to the Hampton Inn Hotel along with commercial property development taking place behind Wal-Mart. An entire retail plaza as well as apartments has been constructed behind the Wal-Mart. A Hobby Lobby, Ross, PetSmart, Texas Roadhouse, GNC, Mo's, Marshalls and others have all been added to the retail plaza over the last 5 years. The East Kentucky Exposition Center along with downtown development continues to make Pikeville the fastest growing city in the region.

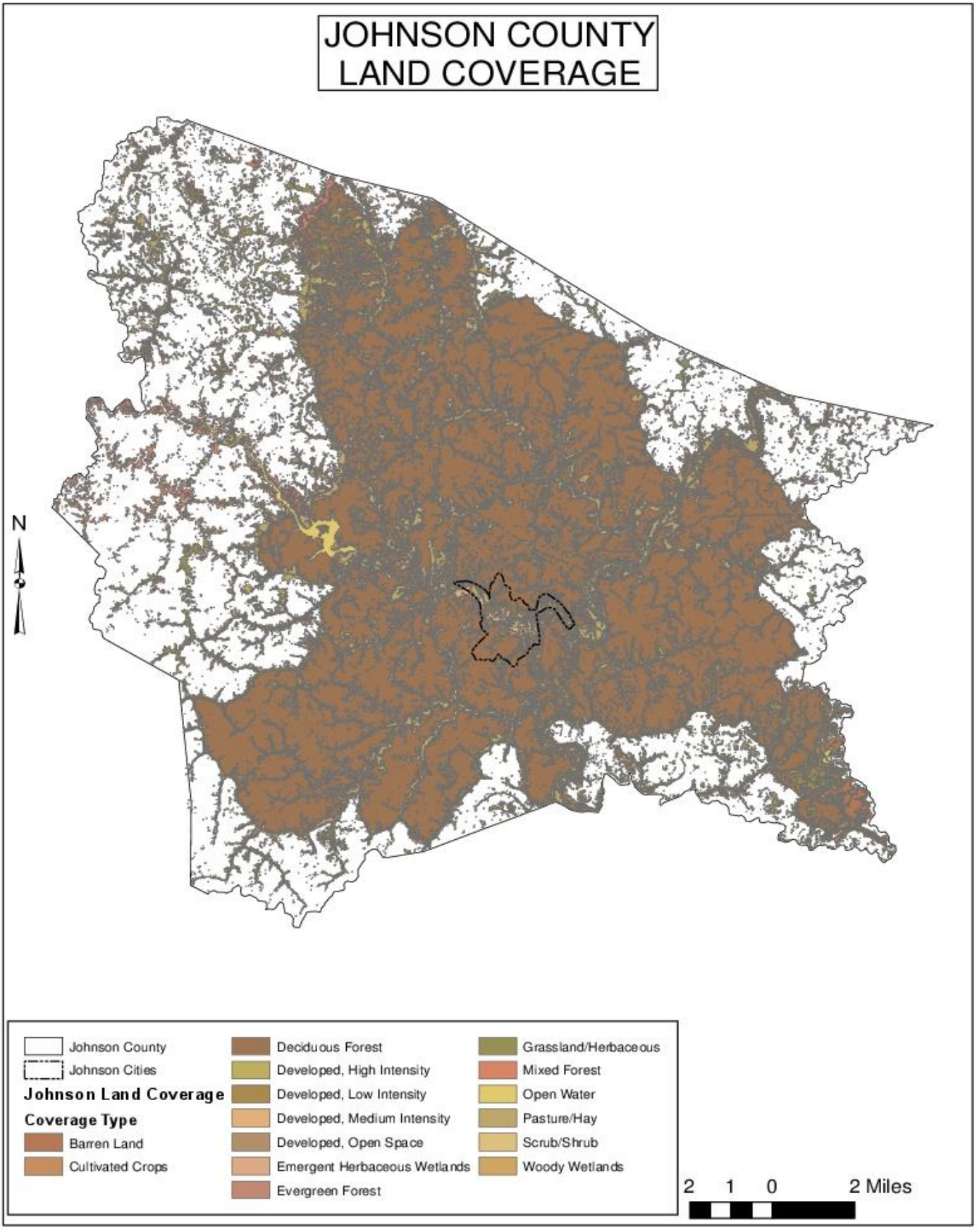
Overall housing development continues to be light in the region and mainly occurs around the cities. Small areas of other housing development continue around the region in rural areas. Housing needs overall are expected to remain constant or drop over the next few years as shown above in the population projections the BSADD region is expected to continue to lose some of its population over the years. HAZUS data and US Census data were used to obtain values used in the updated charts and projections. New building construction and facilities construction will be contingent upon demand and growth in these sectors. All jurisdictions within the region are committed to making sure that any future building or infrastructure construction doesn't take place in flood zones in particular. At this point it appears that construction will be very low to low given the current economic climate, EPA regulation of coal mining, and growth as indicated by the U.S. Census.

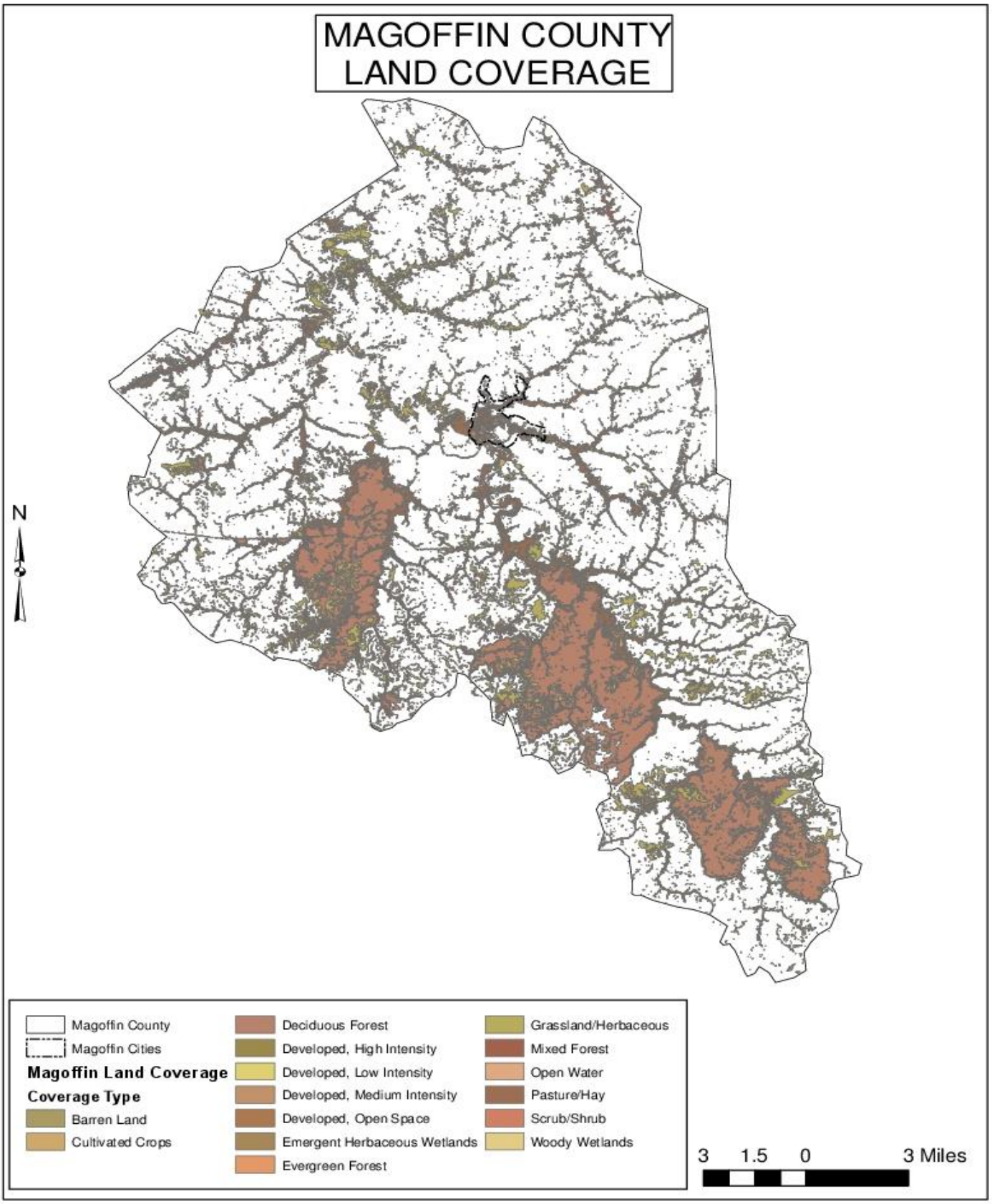
[39]LAND COVERAGE MAPS

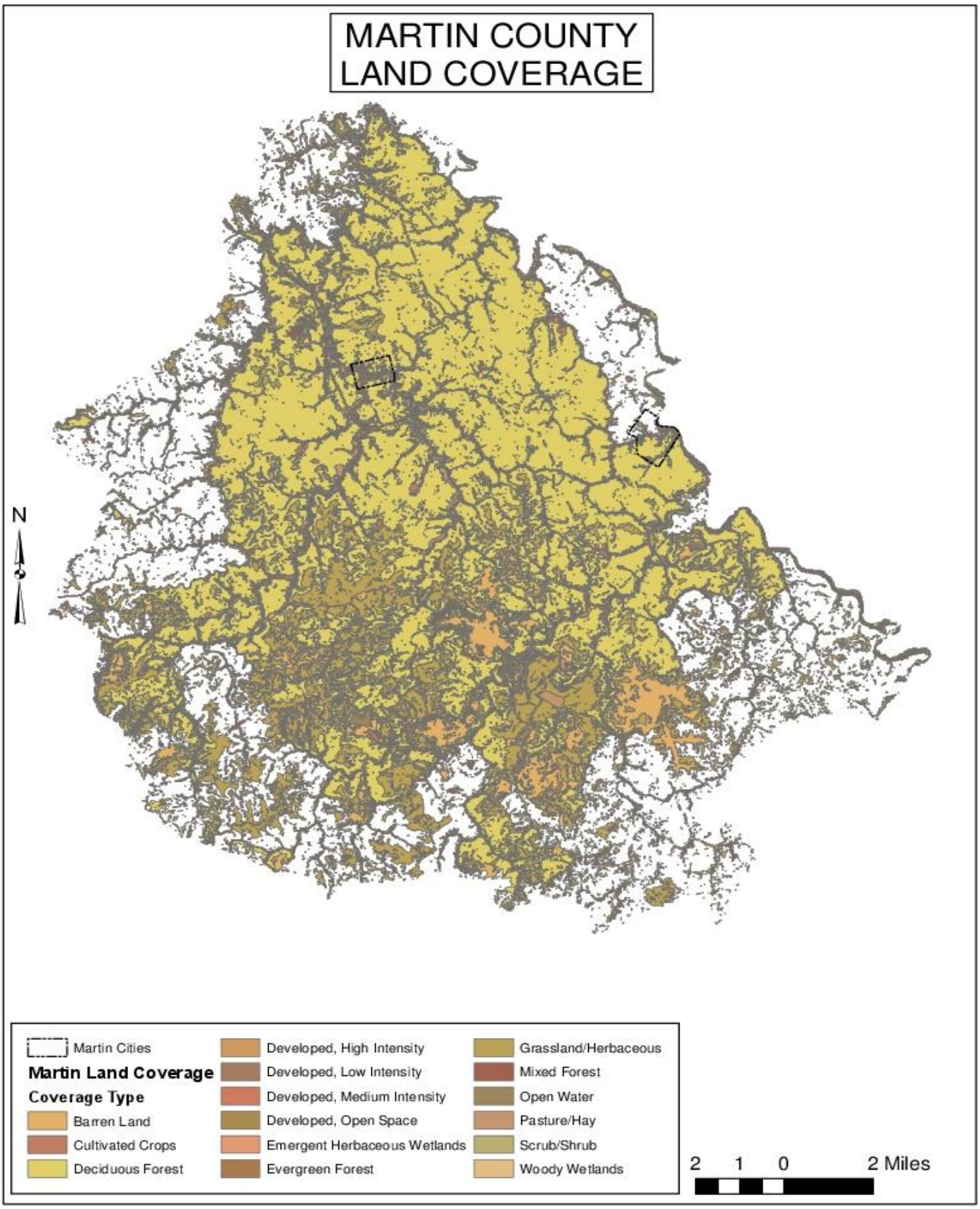


[39] Data taken from: http://kygeonet.ky.gov/


PIKE COUNTY
LAND COVERAGE
N
Pike County
Pike Cities
Pike Land Coverage
Coverage Type
Barren Land
Cultivated Crops
Deciduous Forest
Developed, High Intensity
Developed, Low Intensity
Developed, Medium Intensity
Developed, Open Space
Emergent Herbaceous Wetlands
Evergreen Forest
Grassland/Herbaceous
Mixed Forest
Open Water
Pasture/Hay
Scrub/Shrub
Woody Wetlands
5 2.5 0 5 Miles


JOHNSON COUNTY
LAND COVERAGE
N
Johnson County
Johnson Cities
Johnson Land Coverage
Coverage Type
Barren Land
Cultivated Crops
Deciduous Forest
Developed, High Intensity
Developed, Low Intensity
Developed, Medium Intensity
Developed, Open Space
Emergent Herbaceous Wetlands
Evergreen Forest
Grassland/Herbaceous
Mixed Forest
Open Water
Pasture/Hay
Scrub/Shrub
Woody Wetlands
2 1 0 2 Miles


MAGOFFIN COUNTY
LAND COVERAGE
N
Magoffin County
Magoffin Cities
Magoffin Land Coverage
Coverage Type
Barren Land
Cultivated Crops
Deciduous Forest
Developed, High Intensity
Developed, Low Intensity
Developed, Medium Intensity
Developed, Open Space
Emergent Herbaceous Wetlands
Evergreen Forest
Grassland/Herbaceous
Mixed Forest
Open Water
Pasture/Hay
Scrub/Shrub
Woody Wetlands
3 1.5 0 3 Miles


MARTIN COUNTY
LAND COVERAGE
N
Martin Cities
Martin Land Coverage
Coverage Type
Barren Land
Cultivated Crops
Deciduous Forest
Developed, High Intensity
Developed, Low Intensity
Developed, Medium Intensity
Developed, Open Space
Emergent Herbaceous Wetlands
Evergreen Forest
Grassland/Herbaceous
Mixed Forest
Open Water
Pasture/Hay
Scrub/Shrub
Woody Wetlands
2 1 0 2 Miles

4.7 MULTI-JURISDICTIONAL RISK ASSESSMENT

The following tables offer a summary that assesses the risks to the entire BSADD Region. The first chart is a summary of where the risks vary from one jurisdiction to another for the entire planning area. The second chart summarizes the potential dollar losses to critical facilities and infrastructure by hazard for each county. The third chart summarizes the potential dollar losses to structures by hazard for each county. The following chart summarizes the hazard risk for each jurisdiction and the hazards that may affect each jurisdiction.

Jurisdiction	Flood	Landslide	Tornado	Thunderstorm Severe Wind	Winter Storm	Wildfire	Earthquake	Dam Failure
Floyd County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Allen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Martin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prestonsburg	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wayland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Wheelwright	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Pike County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coal Run	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Elkhorn City	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Pikeville	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Johnson County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Paintsville	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Magoffin County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Salyersville	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Martin County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inez	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Warfield	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

The following chart summarizes the dollar amount replacement cost of exposed critical facilities and infrastructure combined for each county. The Dam Failure, Wildfire and Earthquake fields have been left null until inundation data is available for the analysis.

Jurisdiction	Flood	Landslide	Tornado	Thunderstorm Severe Wind	Winter Storm	Wildfire	Earthquake	Dam Failure
Floyd County	$476,482	$1,690,321	$1,690,321	$1,690,321	N/A	N/A	N/A	N/A
Allen								
Martin								
Prestonsburg								
Wayland								
Wheelwright								
Pike County	$885,247	$2,673,441	$2,673,441	$2,673,441	N/A	N/A	N/A	N/A
Coal Run								
Elkhorn City								
Pikeville								
Johnson County	$248,990	$845,535	$845,535	$845,535	N/A	N/A	N/A	N/A

Paintsville								
Magoffin County	$44,692	$389,568	$389,568	$389,568	N/A	N/A	N/A	N/A
Salyersville								
Martin County	$146,824	$425,073	$425,073	$425,073	N/A	N/A	N/A	N/A
Inez								
Warfield								

The following chart summarizes the dollar amount of exposed structures for each county. The analysis could not be performed on hazards with special hazard areas for counties without GIS locations of structures. The Dam Failure and Earthquake fields have been left null until inundation data is available for the analysis.

Jurisdiction	Flood	Landslide	Tornado	Thunderstorm Severe Wind	Winter Storm	Wildfire	Earthquake	Dam Failure
Floyd County	$952,964,000	$1,690,321,000	$1,690,321,000	$1,690,321,000	$1,690,321,000	$21,579,852	N/A	N/A
Allen								
Martin								
Prestonsburg								
Wayland								
Wheelwright								
Pike County	$1,770,494,978	$2,673,441,700	$2,673,441,700	$2,673,441,700	$2,673,441,700	$43,104,934	N/A	N/A
Coal Run								
Elkhorn City								
Pikeville								
Johnson County	$497,981,900	$845,535,200	$845,535,200	$845,535,200	$845,535,200	$14,295,283	N/A	N/A
Paintsville								
Magoffin County	$89,385,675	$389,568,200	$389,568,200	$389,568,200	$389,568,200	$16,924,300	N/A	N/A
Salyersville								
Martin County	$293,649,693	$425,073,100	$425,073,100	$425,073,100	$425,073,100	$12,597,376	N/A	N/A
Inez								
Warfield								

CHAPTER 5: MITIGATION STRATEGY

The mitigation strategy of this plan was developed through a process utilizing public input, local knowledge, and local officials; through public hearings, Regional Mitigation Planning Committee input, and the Big Sandy ADD Board of Directors input. The Regional Mitigation Committee, general public and the BSADD Board of Directors reviewed the Hazard profiles, and vulnerability assessments. These groups made a determination as to the relevance of each identified hazard. Those identified will be included in the strategy.

The plan includes a mitigation strategy that provides the planning area's blueprint for reducing the potential losses identified in the risk assessment. This strategy is based on existing authorities, policies, programs and resources and the ability of the planning area's jurisdictions to expand on and improve these existing tools. The Regional Mitigation Committee and BSADD staff have identified which authorities, polices, programs, and resources are relevant to this section of the plan and how they impact the implementation of the mitigation strategy.

5.1 CAPABILITY ASSESSMENT

The capacity to carry out the intent and actions included in this plan resides within the region on several levels. The first line of authority is contained in the local jurisdictional governing bodies. There are five county governments four of which are Judge/Executive and magistrate forms and one commission from of government; there are twelve cities, five of which are Mayor/ Council forms and seven Mayor/ Commission forms of government. The power to adopt ordinances and resolutions impacting this plan lies with these units of local government. The Regional Mitigation Committee meets

at least annually to assess the overall needs of the region as a whole and to make recommendations to the Big Sandy ADD Board of Directors, which consists of all the area Judges and Mayors as well as local citizen members. The local jurisdictions' governing bodies have the capacity to carry out the actions within this plan through the use of existing ordinances, resolutions, administrative codes, as well as policies and procedures. The majority of the work associated with the carrying out of this plan will lie with existing staff and officials at the local level of government. Each jurisdiction will make their own staff assignments and develop internal policies and procedures in order to provide the proper oversight and implementation of this plan.

The following two charts represent the jurisdictions' capabilities in regards to their existing ordinances/codes (law), existing internal programs and existing resources to carry out the intent of the laws and programs. The second chart reflects the departments of each jurisdiction that may have specific duties in the implementation, maintenance, monitoring of activities, evaluation of effectiveness, and ongoing public involvement.

CAPABILITIES ASSESSMENT													
	EXISTING AUTHORITIES									**PROGRAMS**		**RESOURCES**	
JURISDICTION	**FLOODPLAIN MANAGEMENT ORDINANCE**	**CRS and FMA PLANS**	**ZONING REGULATIONS**	**SUBDIVISION REGULATIONS**	**LAND DEVELOPMENT PLANS**	**FIRE PREVENTION CODES**	**COMPREHENSIVE PLANS**	**CAPITAL IMPROVEMENT PLANS**	**STORMWATER MANAGEMENT PLANS**	**CERT TEAM**	**NWS STORM READY PROGRAM**	**LOCAL ECONOMIC DEVELOPMENT**	**REGIONAL DEVELOPMENT AGENCY**
FLOYD COUNTY	YES	YES	NO	NO	NO	STATE	YES	NO	NO	NO	YES	YES	YES
City of Allen	YES	YES	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	YES
City of Martin	YES	YES	NO	NO	NO	STATE	YES	NO	NO	NO	NO	YES	YES
City of Prestonsburg	YES	NO	NO	YES	NO	STATE	NO	NO	NO	NO	NO	YES	YES
City of Wayland	NO	YES	YES	NO	YES	STATE	YES	NO	NO	NO	NO	NO	YES
City of Wheelwright	YES	NO	YES	NO	YES	YES	YES	NO	NO	NO	NO	YES	YES
PIKE COUNTY	YES	YES	YES	NO	NO	STATE	YES	YES	NO	YES	YES	YES	YES
City of Coal Run	YES	YES	NO	NO	NO	STATE	YES	NO	NO	NO	NO	NO	YES
Elkhorn City	YES	YES	NO	NO	NO	STATE	YES	NO	NO	NO	NO	YES	YES
City of Pikeville	YES	YES	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO	YES
JOHNSON COUNTY	YES	NO	YES	YES	YES	STATE	YES	NO	NO	YES	YES	NO	YES
City of Paintsville	NO	NO	YES	NO	YES	STATE	YES	NO	NO	NO	NO	NO	YES
MAGOFFIN COUNTY	NO	NO	YES	NO	YES	STATE	YES	NO	NO	YES	YES	NO	YES
City of Salyersville	YES	NO	YES	YES	YES	STATE	YES	NO	NO	NO	NO	NO	YES
MARTIN COUNTY	YES	NO	NO	NO	YES	STATE	YES	NO	NO	NO	YES	YES	YES
City of Inez	NO	NO	YES	NO	YES	STATE	YES	NO	NO	NO	NO	YES	YES
City of Warfield	NO	NO	NO	NO	YES	STATE	YES	NO	NO	NO	NO	YES	YES

CAPABILITIES ASSESSMENT – EXISTING PROFESSIONAL STAFF DEPARTMENTS													
JURISDICTION	BOARD OF EDUCATION	BUILDING INSPECTOR	COUNTY CLERK	EMERGENCY MANAGEMENT	TREASURER	MAYOR / JUDGE EXEC.	HEALTH DEPARTMENT	ROAD DEPARTMENT	SHERIFF DEPARTMENT	CITY POLICE DEPARTMENT	PVA	SOCIAL SERVICES	UTLITIES DEPARTMENT
FLOYD COUNTY	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	NO
City of Allen		NO			YES	YES		NO		YES	NO		YES
City of Martin		NO			YES	YES		NO		YES	NO		YES
City of Prestonsburg	YES	NO		YES	YES	YES		YES		YES	NO		YES
City of Wayland		YES			YES	YES		NO		YES	NO		NO
City of Wheelwright		YES			YES	YES		NO		YES	NO		YES
PIKE COUNTY	YES	NO	YES	YES	YES	YES	YES	YES	YES		YES	YES	NO
City of Coal Run		NO			YES	YES		NO		NO	NO		NO
Elkhorn City		YES			YES	YES		NO		YES	NO		YES
City of Pikeville	YES	YES		YES	YES	YES		YES		YES	NO		YES
JOHNSON COUNTY	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	NO
City of Paintsville	YES	YES		YES	YES	YES		YES		YES	NO		YES
MAGOFFIN COUNTY	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES
City of Salyersville		YES		YES	YES	YES		YES		YES	NO		YES
MARTIN COUNTY	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES
City of Inez		YES		YES	YES	YES		NO		YES	NO		YES
City of Warfield		YES			YES	YES		NO		NO	NO		NO

Legal Authority of Local Jurisdictions

Local governments in Kentucky have a wide range of tools available to them for implementing mitigation programs, policies and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of Kentucky, which are (a) Regulation; (b) Acquisition; (c) Taxation; and (d) Spending.

A. Regulation

General Police Power

Local governments have been granted broad regulatory powers in their jurisdictions. Kentucky Revised Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances).

Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate “nuisances,” which could include, by local definition, any activity or condition that threatens the general health and safety of the public.

All Jurisdictions in the planning area have enacted and enforces regulatory ordinances designed to promote the public health, safety and general welfare of its citizenry.

Building Codes and Building Inspection

Many structural mitigation measures involve constructing and retrofitting homes, businesses and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the use of building codes.

Jurisdictions have the opportunity and the power to develop and enforce building codes. . The option for jurisdictions in the planning area to develop codes exists and will be a great tool to ensure mitigation strategies are in place.

Land Use

Regulatory powers granted by the state to local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enact and enforce zoning ordinances, floodplain ordinances, and subdivision controls.

Planning

Local jurisdictions have the authority to perform a number of duties related to planning, including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans.

Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. The statutory purpose for the grant of power is to promote health, safety, morals, or the general welfare of the community. Land "uses" controlled by zoning include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and set- backs, density of population, etc.

Subdivision Regulations

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division/sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures.

Floodplain Ordinance

The purpose of the local floodplain Ordinances is to (1) minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage; (2) prevent and minimize loss of life, injuries, property damage and other losses in flood hazard areas; and (3) promote the public health, safety and welfare of citizens of the jurisdiction in flood hazard areas. The ordinance also makes certain that they meet the minimum requirements of participation in the National Flood Insurance Program (NFIP). The incentive for local governments adopting such ordinances is that they will afford their residents the ability to purchase flood insurance through the NFIP and be eligible for state Hazard Mitigation funding.

B. Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely "hazard proofing" a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. The state of Kentucky legislation empowers cities, towns, counties to acquire property for public purpose.

C. Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by the State of Kentucky. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community.

D. Spending

The fourth major power that has been delegated from the Kentucky General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption annual budgets.

Political Willpower

Most residents of the jurisdictions have a general knowledge about the potential hazards that their community faces. However, residents have had very little education concerning actions that increase or decrease the communities' vulnerability to certain hazards. Education concerning mitigation strategies and potential losses will be a key factor for all jurisdictions in the planning area.

Because of the history with natural disasters in the past 10 years, it is expected that the current and future political climates are favorable for supporting and advancing future hazard mitigation strategies. Jurisdictions have faithfully attended and participated in the mitigation planning process, largely due to the fact that the region has been widely affected by these natural disasters.

The summary of duties and responsibilities associated with each of the above departments; authorities and programs are specifically spelled out in the administrative codes; personnel policies; KRS (KY Revised Statutes); and local policies and procedures as they pertain to the specific type of local jurisdiction. The overall utilization of this plan will depend in great part on the participation of the departments and personnel of the individual jurisdictions; regional agencies; and local officials. The following is a summary of the basic functions of each of the above listed entities:

Boards of Education: Are responsible for the oversight and management of the individual school districts for which they are elected to represent. County resources in the forms of local taxes/ bond issues are utilized for most capital improvements, while the state is normally responsible for salaries, textbooks, and supplies.

Building Inspectors: enforce the local ordinances, collect permit fees, and oversee the building codes compliance, National Flood Insurance compliance, and other local ordinances and code as they apply to the built environment.

PVA; County Clerks; and Sheriffs' Departments: are all elected positions with very specific duties and responsibilities defined by KRS, and include property valuations by the PVA office; County Clerk is the custodian of Fiscal Court Records and county real and tangible property records and is funded through fees and state funds; Sheriff's Departments are primarily responsible for law enforcement and real property tax collection for the county government and various sub-divisions of county government that operate on local tax revenues.
Emergency Management: is responsible for preparedness and response to natural and made cause disasters, as well as coordinating and providing assistance for mitigation of disasters. Each county emergency management office is mandated by KY Revised Statutes.

Treasurers: are the fiscal officers responsible for the management and oversight of each jurisdiction's funds (revenues and expenses).

Elected Jurisdictional Heads: are the County Judge Executives and City Mayors, who have the responsibilities of the day to day running of the local units of government and all aspects of that responsibility.

Health Departments: are governed by local Boards and provide a wide variety of Health Services to the county residents and jurisdictions within each county.

Road Departments: are responsible for the general maintenance and repairs as well as capital improvements projects to roadways within their jurisdictional boundaries.

City Police Departments: are responsible for law enforcement within their specific jurisdictional boundaries.

Social Services offices: consist of both the unemployment offices and the Kentucky Cabinet for Human Services offices and provide registration for Unemployment benefits and job search assistance and wellness, and child protective services to families

Local Utilities: are responsible for providing potable drinking water; wastewater collection and treatment and gas distribution to the general public within their service areas.

E. Summary

The above listed departments will be utilized throughout the process of implementing the activities outlined in this plan in order to streamline the process of reducing costs of recovery from the identified hazards located herein. Each individual jurisdiction will assign duties to the appropriate department in order to facilitate and economically carry out the intent of this plan. Many of the local jurisdictions within the five counties are very small and have only 3 to 5 staff, in these instances the small jurisdictions rely heavily on the County Governments to carry out many of the necessary functions, including emergency response and preparedness as well as partnering with their associated counties in order to carry out larger construction projects which they would not have the resources to complete on their own. All five counties and twelve cities are listed as distressed by the Appalachian Regional Commission (ARC), and do not have available local funds for any large construction projects.

Because of the overall lack of personnel at the local jurisdictions and because of the lack of available funds, the Big Sandy Area Development District has become the primary technical assistance agency, providing planning; budget preparation assistance; code development; resolution and ordinance development; and policies/procedures development assistance to most of the smaller jurisdictions. The Area Development District also provides project funding development packages, grant writing services, grant administration services, as well as financial management assistance when asked.

Again, because most of the cities are financially limited, the mitigation committees concluded that the information contained in the capability assessment chart will dramatically determine the prioritization and implementation of mitigation actions. County governments have the greatest resources and all cities rely upon their county's support, to varying degrees, to provide assistance in funding, policies and authorities issues. Therefore, the mitigation committees agreed that the goals, objectives and actions need to be prioritized and implemented at the county level. The BSADD counties have a vested interest in each city's success and have the ability to "fill-in" the gaps that normally exist. The counties' ability to help the cities will eventually bridge the deficits and increase the ability to enforce and implement mitigation strategies that will reduce potential hazard losses identified in the Risk Assessment section of this document. Obviously, each city can implement their mitigation actions on their own when funding becomes available for them to do so independent of the county's governing powers should the opportunity present itself.

5.2 LOCAL HAZARD MITIGATION GOALS

Big Sandy Area Development District staff and the county mitigation committees analyzed the loss estimates in the risk assessment to establish goals and objectives for loss reduction based upon that analysis. These goals were established by the mitigation committees in each county, and when appropriate, were adopted by the city jurisdictions. These goals and objectives will be the blueprint for development of specific actions that will reduce the jurisdictions potential losses as identified in the risk assessment.

Mitigation Goals were designed to be general guidelines of what is to be achieved. These goals are for long-term and represent the overall vision of the mitigation plan. The objectives define the strategies and implementation steps to attain the identified goals. These objectives are specific, measurable, and have a defined completion. The goals and objectives were established and combined to make a complete list for jurisdictions in the planning region to adopt.

The local mitigation committee met to review and analyze the risk assessment studies for each identified hazard. The following goals and objectives were determined to have the greatest benefit in hazard reduction in the Big Sandy region.

Goal 1: To reduce disruptions to essential public services and infrastructure by reducing the vulnerability to critical facilities during hazard events.

Purpose of Goal in Relation to the Risk Analysis

During the review of the risk analysis, committee members determined that the greatest vulnerability is the affects that natural hazards have in providing essential services to the general public. For example, during a flood event, the most likely damages are the destruction of roadways and bridges caused by washouts, undercutting and stream debris. Debris from tornados, severe thunderstorms, wildfires, dam/levees, and winter storms can erupt needed utility services,

as well as transportation roads for emergency first responders. Therefore, the following objectives were formulated as a result of this goal.

- Objective 1.1 Minimize the disruption to and enhance rapid restoration of transportation systems.
- Objective 1.2 Minimize the disruption and enhance rapid restoration of utility systems.
- Objective 1.3 Reduce the number of critical facilities in hazard areas.
- Objective 1.4 Minimize the damages to groundwater and the environment as a result of damages caused by hazards.
- Objective 1.5 Mitigate against future damage by ensuring local dams are up to code.
- Objective 1.6 Improve first responder equipment throughout the region.

Goal 2: Protect each jurisdictions most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.

Purpose of Goal in Relation to the Risk Analysis
During the risk assessment, structures have been identified as being in a particular hazard area, many of which are critical facilities. Structures need to be removed from the hazard area completely or built to appropriate standards to reduce the potential losses. Not only are these structures at risk, they put other structures at risk by becoming debris that can be thrown by wind and water. Each jurisdiction needs to consider mitigation actions that will reduce the number of these structures that are located in hazard areas, especially critical facilities.

- Objective 2.1 Reduce the numbers of structures and critical facilities in identified hazard areas.
- Objective 2.2 Utilize available mitigation measures to reduce the number of vulnerable structures in the hazard areas.
- Objective 2.3 Improve the resistance of structures in the community against natural hazards.

Goal 3: Enhance existing or design new county policies that will reduce the potential damaging effects of hazards without hindering other community goals.

Purpose of Goal in Relation to the Risk Analysis
During the evaluation of the risk assessment and the documentation in the capability assessment, it was determined that the potential losses to the identified risks may be reduced simply by county and city policies that will regulate future development in hazard areas. The capability identifies the lacking existing authorities, policies, programs and resources that can reduce the potential losses in each city and county. Enforcement of existing policies may reduce the number of existing and future structures that are built in flood hazard areas. Policies that regulate and guide the development of future infrastructure such as transportation, lifeline utilities, and essential facilities will drastically reduce the vulnerability of these facilities. Therefore, the following objectives have been developed.

- Objective 3.1 Enforce and enhance existing policies and authorities.
- Objective 3.2 Develop new policies such as ordinances and building codes that will require new structures meet standards for hazard areas.
- Objective 3.3 Revise existing and develop new regulations that promote mitigation activities.

Goal 4: Protect public health, safety and welfare by increasing the public awareness of existing hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards.

Purpose of Goal in Relation to the Risk Analysis
During the evaluation of the risk assessment, it was determined that in order to reduce the number of structures in hazard areas, the general public needs to be aware of the potential risks and high potential risk areas. Policies of the local governments can be developed, however, education will ensure those policies are effective to reduce the number of existing and future structures in hazard areas. Public awareness can serve two major points in the mitigation strategies. First, in an education capacity, the seriousness of the potential for disaster and damages can be communicated. The risk assessment clearly defines areas for potential disaster. The more the citizenry knows about the potential, the more likely they are to take appropriate steps in securing their property and protecting their families against the dangers that are associated with the identified hazards. Second, citizens and visitors alike can be made

aware of evacuation routes, which physically remove people from the path of danger. The risk assessment identifies the fact that severe thunderstorms, tornados, and severe winter storms, floods, dam/levee failures, lightning, and hail, may occur at any place in the region and affect any jurisdiction. Simply educating the public of when and how to evacuate the hazard areas may reduce the potential for loss of life. Therefore, the following objectives have been developed.

- Objective 4.1 Educate the Public about hazards prevalent in their jurisdiction.
- Objective 4.2 Increase Public understanding, support, and awareness for Hazard Mitigation.
- Objective 4.3 Develop, maintain and publicize evacuation routes.
- Objective 4.4 Educate the citizenry about the availability of Insurance options.

Goal 5: Increase the technical capabilities of local jurisdictions to reduce potential losses.

Purpose of Goal in Relation to the Risk Area
Reducing potential losses in identified hazard areas depends largely on the ability of the community to communicate, plan, and implement modern technologies to reduce potential losses. During review of the risk assessment, committee members determined that hazards simply will occur and some hazards will occur more often than others. Improving each jurisdiction's technical capabilities will provide the necessary equipment to effectively communicate the hazard risks to the general public, communicate with key critical services including emergency personnel, as well as locate potential losses and damages using modern technology. The hazard profile and risk assessment sections of this plan identify how future updates and information collection will be included in future plan updates using modern technologies. The development of this data will help to reduce damages to existing and future buildings by enhancing the ability to identify risks and hazard locations. Enhancing each jurisdiction's technical capability may be to simply insure that all repetitive loss properties are identified, placed in a database, and mapped. Developing such technical capability with databases can be costly and time consuming. This type of project will require grant funding and has the potential to require outside assistance to jurisdictions from the Area Development District for its implementation. Regardless of the cost and time required to implement this strategy, mitigation committees for each jurisdiction have agreed that the data collected will provide them with invaluable information and will be a primary strategy in mitigating multiple hazards. Therefore, the following objectives have been developed.

- Objective 5.1 Improve each jurisdictions capability to identify and map vulnerable structures and critical facilities.
- Objective 5.2 Reduce vulnerability of future development by creating databases that identify risk areas and loss potentials in order to mitigate during development.
- Objective 5.3 Increase the jurisdiction's ability to communicate and direct emergency services and resources to the appropriate hazard areas.

Goal 6: Build local support and commitment to continuously become less vulnerable to hazards.

Purpose of Goal in Relation to the Risk Area
Even though this goal does not directly reduce potential damages, this goal will increase the jurisdictions capability to effectively manage major emergencies more effectively. During the review of the capability assessment in concert with the vulnerabilities, mitigation committee members and public input identified the need for support for the limited professional staff. This is due to the inability of local jurisdictions to hire and maintain revenue to keep professional staff on hand. This goal will help to increase the capabilities and resources of the local jurisdictions.

- Objective 6.1 Train volunteers to support and implement mitigation activities that will enhance the response capabilities of the local jurisdictions.

Public meetings were held to solicit input into the development of goals and objectives. The Regional Mitigation Committee and BSADD Board of Directors meetings were all open public meetings. A time was allowed at each for public input and comment. The public input along with the goals and objectives established by all committees were compiled into a single listing by the BSADD staff. This listing was reviewed by the Regional Mitigation Committee and presented to the BSADD Board of Directors for approval.

Summary
Goals one through four including their respective objectives are regional in nature and will involve the coordination of the Regional Mitigation Committee with units of local government over the next several years. These four goals are aimed

at maximizing the local resources by implementation regionally where feasible, spreading the costs of each over the entire region to minimize impacts to all units of local government. All of these goals and objectives were designed with addressing the regionally impacting hazards utilizing local and regional resources as well as any available state and federal resources in order to accomplish results in as timely and efficient manner as possible.

All the above goals address the individual jurisdictions desires to have a direct impact upon reduction of the reoccurring high costs associated with each type of hazard recovery as well as to strengthen the units of local government's abilities to provide mechanisms to reduce and eliminate as much human suffering and loss as possible. The individual local government's action items as discussed in the following sections. The overall cost benefit review utilizes past disaster data on reoccurring damage areas where feasible and incorporates local estimates of each mitigation activity in order to determine an estimate of the benefits of mitigating these problems. The actions items under the above goals were developed by the units of local government officials to directly reduce the costs associated with disaster recovery. Identified funding sources for these action items may include but not be limited to FEMA; USDA Rural Development; Economic Development Administration (EDA), Appalachian Regional Commission (ARC); State Funds, and Local Funds.

5.3 IDENTIFICATION AND ANALYSIS OF MITIGATION MEASURES

1. **Prevention:** Preventative activities are used to stabilize or prevent hazard events from getting worse reducing a community's future vulnerability. Examples:

    • Planning/Zoning • Drainage System Maintenance • Open Space Preservation
    • Capital improvements Programming • Floodplain Regulations • Storm water Management
    • Shoreline/ Riverine / Fault Zone Setbacks

2. Property Protection: Property protection measures address the issue of what to do with the critical facilities and other existing properties located in hazardous locations. Examples:

• Acquisition • Critical Facilities Protection • Relocation • Insurance
• Building Elevation • Safe Rooms • Retrofitting (i.e., wind proofing, flood proofing, etc.)

3. Natural Resource Protection: Usually carried out by parks, recreation or conservation agencies in an effort to reduce the impact of natural hazards using preservation or restoration techniques. Examples:

• Floodplain Protection • Erosion & Sediment Control • Beach & Dune Preservation
• Wetland Preservation & Restoration • Riparian Buffers • Habitat Preservation
• Fire resistant Landscaping • Slope Stabilization • Fuel Breaks

4. Structural Projects: Projects that modify environmental elements that impacts hazard events. Examples:

• Channel Modification • Levees/ Dikes / Floodwalls / Seawalls • Reservoirs
• Beach Nourishment • Diversions / Detention / Retention • Storm Sewers

5. Emergency Services: Indirectly impact the residents and their property by using "mitigation techniques" immediately prior to, during or after a disaster has occurred. Examples of these services are:

• Warning Systems • Sandbagging (Flood Protection)
• Evacuation Planning/Management • Installing Shutters (Wind Protection)

6. Public Information Awareness: Educates residents, business owners, etc. of the hazards, hazard prone areas and mitigation programs and techniques they can use to protect themselves and their property. Examples:

• Outreach Projects • Hazard Expositions
• Hazard Map Information • Real Estate Disclosure • Library Materials • School Children Education • Speaker Series/Demonstration Events

The mitigation goals and objectives were established by the county and regional mitigation committees. The overall plan was adopted by each jurisdiction and was based upon our own limitations in capabilities of each jurisdiction and available funding for the projects. The actions identified in the chart below explains the plan's standardized template

making each action easier to read, comprehend, evaluate, define and implement current actions and to develop future mitigation actions in updates of this plan that will reduce potential losses.

Mitigation Action Plan Structure and Criteria	
Jurisdiction(s)	This identifies the jurisdiction adopting the action
Category of the Action	This designation will identify classification of the following actions: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, Public Education, Awareness
Hazard(s) Mitigated	Lists the hazard(s) that the action is designated to mitigate.
Estimated Costs	The cost to implement the action. The amount is an estimation of cost.
Funding Method	Lists potential funding agencies or fund names.

BIG SANDY ADD FEMA MITIGATION GOALS

GOAL #1: TO REDUCE DISRUPTIONS TO ESSENTIAL PUBLIC SERVICE AND INFRASTRUCTURE BY REDUCING THE VULNERABILITY TO CRITICAL FACILITIES DURING HAZARD EVENTS.

Objective: 1.1 Minimize the disruption to and enhance rapid restoration of transportation systems.

ACTION 1.1.1 Remove Debris from Streams that cause damage to bridges and transportation facilities.

Benefit: Natural and man-made activities generate a variety of debris that includes but is not limited to, trees and vegetative matter, building construction material, appliances, personal property, mud, and sediment deposits. The quantity/type of debris generated from any disaster will be based on the location/ kind of event experienced plus its magnitude, duration and intensity. This action will reduce damages to existing/future facilities caused by debris in streams produced by disasters.

Jurisdiction(s): ALL
Category of the Action: Prevention
Estimated Costs: $50,000-100,000/yr.
Hazard(s) Mitigated: Flooding
Funding Method(s): Local funds, prevention/ natural resources grants

ACTION 1.1.2 Improve the county's ability for debris removal through the purchase of new equipment.
Benefit: Debris removal in the region continues to be a major concern for the local entities. Investments should be made to aid the counties in improving and providing new debris removal equipment to help mitigate against future events and improve speed and cost of future cleanups.

Jurisdictions: ALL
Category of the Action: Prevention
Estimated Costs: Vary depending on the equipment
Hazards Mitigated: ALL Identified Hazards
Funding Methods: Local funds, state, federal grants, hazard mitigation grants.

ACTION 1.1.3 Improve and replace hazardous bridges and culverts throughout the county
Benefit: Drainage is a major concern for all the entities in the Big Sandy Region and improvements need to be made. The Big Sandy Region is home to numerous streams and waterways and improved culverts and bridges would help alleviate some problems with flooding.

Jurisdictions: ALL
Category of Action: Prevention
Estimated Costs: Vary
Hazards Mitigated: ALL Identified Hazards
Funding Methods: Local funds, state, federal grants, hazard mitigation grants.

ACTION 1.1.4 Reduce identified major reoccurring flooding hazards by creating engineered studies/databases addressing mitigation actions needed to correct or elevate those situations.

Benefits: Mitigation Committees identified through the flood profile and risk assessment certain streams have the greatest potential losses and produce the greatest losses from past disasters. Many large streams in all five counties cause damage from backed-up water due to debris, sediment, development, etc. An engineering study creating a database that can be shared with other planners that determines the exact location in the streams will allow for more effectively planning, and implement mitigation strategies to reduce losses to structures in and around current and future development sites.

Jurisdiction(s): ALL
Category of the Action: Property Protection
Estimated Costs: $60,000-$80,000/county
Hazard(s) Mitigated: Flooding
Funding Method: Federal Funding, Pre-Disaster Mitigation Funds

ACTION 1.1.5 Develop a coordinated, interagency sustained debris removal plan

Benefits: Debris from disasters can disrupt needed utility services, as well as transportation facilities such as roads and bridges for emergency first responders. Debris generated from Natural Hazards may cause damages to existing structures if not properly mitigated before/after a disaster. Debris generated from public/private property may increase damages to other structures if not properly mitigated. The development of the debris removal plan consists of the following:

a. Develop a proposed command structure
b. Pre-designate staging and dumping sites
c. Pre-qualify contractors to be used
d. Identify specialized equipment needs
e. Provide for recycling of materials
f. Debris removal from public and private properties.

Jurisdiction(s): ALL
Category of the Action: Prevention/Property Protection
Estimated Costs: $51,000 (3,000 each jurisdiction)
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method(s): PDM Grant, Local Matching Funds

ACTION 1.1.6 Establish emergency disaster relief warehouses/stations.

Benefits: Alerting the traveling public of blocked roadways, high waters and other disaster related events may prevent deadly accidents. By having this warehouse/station located in strategic locations in each county, emergency first responders will have such items as flashing lights, barricades, flashlights, etc. at various identified hazard areas throughout each jurisdiction.

Jurisdiction(s): Martin, Magoffin, Johnson, Floyd
Estimated Costs: $15,000 (3,000 each jurisdiction)
Category of the Action: Prevention/Property Protection/Public Safety/Emergency Services
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method(s): PDM Grant, Local Matching Funds

Objective 1.2 Minimize the disruption and enhance rapid restoration of utility systems. Assure that all emergency facilities have temporary back-up power capabilities.

ACTION 1.2.1 Work with utility companies to trim trees and haul debris away from overhead power lines.

Benefits: As committee members evaluated risk assessment the vulnerabilities, it was determined that a plan to trim trees and obstructions as well as remove debris away from utilities/infrastructure would greatly reduce the potential losses to these facilities. During winter storms, tress tend to fall onto overhead power lines causing significant losses that affect the quality of life for residents, as well as the dollar losses sustained by the local jurisdictions and utility companies. In addition to trimming/removing potential debris, anything that is debris after an event needs to be properly handled/disposed of in order to minimize the effects on the environment that may occur, especially in future flooding events.

Jurisdiction(s): ALL
Category of Action: Prevention
Hazard(s) Mitigated: Thunderstorms/Wind Events, Severe Winter Storms, Tornadoes, Flooding
Estimated Costs: $25,000/yr.
Funding Method: Local Utility Funds

ACTION 1.2.2 Provide generators at critical facilities such as fire/police departments, EOC/dispatch centers, hospitals, city buildings, water pump stations, utility departments and emergency shelters.

Benefits: In the event that power and utilities are lost, generators provide critical facilities to continue to offer needed services to the jurisdictions. Though this action does not reduce the number or types of existing buildings in the hazard area, it allows these facilities to function during a hazard event.

Jurisdiction(s): ALL
Category of the Action: Prevention
Estimated Costs: $2,000-$3,000/county
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method(s): Prevention Grants, Local Funds

ACTION: 1.2.3 Evaluate current dams/levees. Review specifications for dams, including certification, restoration and repair.

Benefits: The Big Sandy Region is home to 3 Corps of Engineers dams and numerous smaller dams. In order to prevent major potential damage and to mitigate against a future dam related disaster the committee has determined that studies must be performed on the current dams to study potential restoration and repair needs in the future.

Jurisdictions: ALL
Hazards Mitigated: Flooding
Category of the Action: Prevention
Funding Methods: Prevention grants, local funds, mitigation grants.
Estimated Costs: Vary

ACTION 1.2.4 Improve first responder, rescue equipment, communications and flood rescue.
Benefits: The Big Sandy Region is home to remote locations and lots of water. This cause issues for first responders that deal with communication issues, flood rescue issues and vulnerabilities to respond to hazards. Improving their current responder equipment would ensure the local response time would be improved no matter the hazard or the location.

Jurisdiction(s): ALL
Category of the Action: Prevention
Hazard(s) Mitigated: ALL Identified Hazards
Estimated Costs: Vary depending on equipment.
Funding Method(s): Prevention Grants, Local Funds

GOAL #2: PROTECT EACH JURISDICTION'S MOST VULNERABLE POPULATION, BUILDINGS AND CRITICAL FACILITIES THROUGH IMPLEMENTATION OF COST EFFECTIVE AND TECHNICALLY FEASIBLE MITIGATION PROJECTS.

Objective 2.1 Reduce the numbers of critical facilities in identified hazard areas.

ACTION 2.1.1 Reduce the numbers of critical facilities in identified hazard areas.

Benefit: North Magoffin Fire Station, Long Fork Pump Station (Pike), Greasy Creek Pump Station (Pike), Pike Central Pump Station, Long Branch Pump Station, (Pike) Big Creek section of waterline (Pike), Long Branch section of waterline (Pike), Creek/River Crossings in all five counties.

Jurisdiction(s): ALL
Estimated Costs: Varied costs (elevation, relocation/demolishing)
Category of the Action: Property Protection
Hazard(s) Mitigated: Flooding
Funding Method(s): HMGP, Local Match

Objective 2.2 Utilize available mitigation measures to reduce number of vulnerable structures in the hazard areas.

ACTION 2.2.1 Purchase and remove homes damaged by flooding. (Severe Repetitive Loss)

Benefit: Each County's mitigation committee recognized homes that have incurred damage from flooding over the years. Vulnerability assessment maps identified these structures are located in a high flood risk hazard area according to the NFIP. Committee members identified the potential loss to these sites not only poses a threat to the property owners, but also to those that travel transportation routes. This acquisition action will remove the threat from future damages:

Jurisdiction(s):	ALL		
Category of the Action:	Property Protection	**Hazard(s) Mitigated:**	Flooding/Landslide
Estimated Costs:	N/A, because based on damage	**Funding Method(s):**	HMGP, Local Match

Objective 2.3 Improve the resistance of structures in the community against natural hazards.

GOAL #3: ENHANCE EXISTING OR DESIGN NEW COUNTY POLICIES THAT WILL REDUCE THE POTENTIAL DAMAGING EFFECTS OF HAZARDS WITHOUT HINDERING OTHER COMMUNITY GOALS.

Objective 3.1 Enforce and continue to develop and enhance existing floodplain policies and authorities.

ACTION: 3.1.1 Enforce the county NFIP flood ordinances.

Benefits: The current policy outlines the restrictions and rules to follow on construction in the floodplains. Local committees and public review recognized a lack of enforcement of the current policy. Enforcement of existing policies is relatively low in cost, and reaps great benefits in reducing potential losses. Floodplain coordinators are working with area banking institutions to insure that home buyers/builders are aware of the flood ordinances.

Jurisdiction(s):	ALL		
Category of the Action:	Prevention, Awareness	**Hazard(s) Mitigated:**	Flooding
Estimated Costs:	Minimal---Staff Time	**Funding Method(s):**	Local Revenue

Objective 3.2 Develop policies (ordinances & building codes) to require new structures to meet standards for hazard areas.

ACTION 3.2.1 Improve the enforcement of current building codes to include mitigation activities.

Benefits: Building Codes currently in place will be enhanced by including mitigation activities where applicable and feasible. Any cost of these activities will primarily be by the individual or construction developer during projects.

Jurisdiction(s):	ALL Cities		
Category of the Action:	Prevention, Awareness	**Hazard(s) Mitigated:**	ALL Identified Hazards
Estimated Costs:	Minimal	**Funding Method(s):**	Developers, Owners

ACTION 3.2.2 Develop zoning and land use ordinances that will regulate development in hazard areas particularly pre-disaster mitigation flooding clean-up ordinances.

Benefits: During the evaluation of the capability assessment, mitigation committee members determined that the local jurisdictions lack in the area of zoning and land use regulations in several counties. Development of these regulations

will allow the local jurisdiction to regulate the type of development in hazard areas. Also, develop additional ordinances to address pre-mitigation flooding clean-up issues.

Jurisdiction(s): ALL
Category of the Action: Prevention
Estimated Costs: Minimal
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method(s): Local Revenue

GOAL #4: PROTECT PUBLIC HEALTH, SAFETY AND WELFARE BY INCREASING AWARENESS OF EXISTING HAZARDS AND BY FOSTERING BOTH INDIVIDUAL/PUBLIC RESPONSIBILITY IN MITIGATING RISKS.

Objective 4.1 Educate the Public about hazards prevalent in their jurisdiction.

ACTION 4.1.1 Educate residents of their location in the Hazard areas by providing maps and hazard information.

Benefits: Educating residents about their location in a particular hazard area will result in the reduction of the potential losses by the property owner taking the appropriate precautions during a hazard occurrence.

Jurisdiction(s): ALL Jurisdictions
Category of the Action: Awareness
Estimated Costs: $3,000/county (printing costs)
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method(s): Local Revenues, Prevention Grants

ACTION 4.1.2 Continue Promoting use of NOAA "ALL HAZARDS" radios for early warning & post event information.

Benefits: NOAA Weather Radio is a nationwide network of radio stations broadcasting continuous weather information direct from nearby National Weather Service Offices. These stations broadcast warnings, as well as post event information for all types of hazards, both natural and man-made. These warnings provide people time to react and take preventative measures before dangerous weather or other hazard conditions stricken their area.

Jurisdiction(s): ALL
Category: Awareness **Estimated Costs:** $0.00 (Public Service Announcements are free)
Hazards Mitigated: ALL Identified Hazards **Funding Method:** N/A

Objective 4.2 Develop supplemental evacuation plans, policies, and procedures for all hazards.

ACTION 4.2.1 Develop supplemental plans to be included in each county's EOP.

Benefits: Counties currently have evacuation plans as part of their emergency operations plan (EOP). This action will develop more detailed, refined evacuation procedures for specific hazard areas, especially flooding and landslide hazards. This action will help protect the public by having plans in place to assist those threatened by various emergency conditions evacuated to safely. The plans will include a determination of conditions under which evacuation may be necessary, specific evacuation routes, plans/procedures for different types of emergencies; and provision for assisting those with disabilities.

Jurisdiction(s): ALL
Category of Action: Prevention
Estimated Costs: $5,000/county ($25,000 total)
Hazard(s) Mitigate: ALL Identified Hazards
Funding Method: Pre-Disaster Mitigation Grant

Objective 4.3 Educate the citizenry about the availability of insurance options

ACTION 4.3.1 Educate residents on the availability and importance of Flood Insurance.

Benefits: During evaluation of the risk assessment, committee members determined that a sustained mitigation effort should be to inform residents of their location in flood hazard zones, and the availability of flood insurance. Homeowners who carry flood insurance help to relieve the economic burden that is placed on FEMA disaster assistance and the local government.

Jurisdiction(s): ALL
Category of Action: Public Awareness
Estimated Costs: $1,500/county
Hazard(s) Mitigated: Flooding
Funding Method: Prevention Grants

GOALS #5: INCREASE THE TECHNICAL CAPABILITIES OF LOCAL JURISDICTIONS TO REDUCE POTENTIAL LOSSES.

Objective 5.1 Improve each jurisdiction's capability to identify & map vulnerable structures & critical facilities in hazard areas.

ACTION 5.1.1 Create a GIS database inventory of all critical facilities and structures in each hazard area.

Benefits: During the risk assessment, several structures and faculties were identified as being in hazard areas. However, data on each of those structures and facilities is very limited. Creating a database will allow more detailed information to be collected on type, value, elevation, and construction type of each facility and be able to produce in GIS format. This data would provide a geographic link to the wealth of valuation and land use information contained in the PVA office. BSADD has a database and is willing to add to the database when supplied additional updates from our jurisdictions.

Jurisdiction(s): ALL
Category of Action: Prevention/Awareness
Hazard(s) Mitigated: ALL Identified Hazards
Estimated Costs: $10,000-$12,000/county
Funding Method: Pre-Disaster Mitigation

Objective 5.2 Reduce vulnerability of future development by creating databases that identify risk areas and loss potentials in order to mitigate during development.

ACTION 5.2.1 Create a GIS database inventory of repetitive loss structures in each flood hazard area.

Benefits: During the Risk Assessment evaluation, the NFIP repetitive loss list had a limited number of properties listed in its database. Committee members have noted that based on past disaster experience, it seems to them that this database is weak, and does not identify the repetitive loss structures in each county. Much of the deficit in data is possibly the result of the lack of education and participation in the NFIP. If FEMA and the NFIP provide additional information to the ADD, a more accurate database will result with a more realistic picture of flood hazard areas in the region.

Jurisdiction(s): ALL
Category of Action: Prevention/Property Protection
Hazard Mitigated: Flooding
Estimated Costs: $25,000-$30,000/county
Funding Methods: Pre-Disaster Mitigation funds

ACTION 5.2.2 Create an engineered database addressing mitigation actions needed to correct or elevate those situations.

Benefits: The Mitigation Committees identified that certain streams have the greatest potential losses and produce the greatest losses from past disasters. Many large streams can cause damage from backed-up water due to debris, sediment, development, etc. An engineering study creating a database that determines the exact location in the streams will allow for more effectively planning, and implement mitigation strategies to reduce losses to structures in and around current and future development sites. Please see the Risk Assessment portion of this plan for locations of identified re-occurring flooding areas.

Jurisdiction(s): ALL
Category of the Action: Property Protection
Hazard(s) Mitigated: Flooding
Estimated Costs: $60,000-$80,000/county
Funding Method: Federal Funding, PDM Funds

Objective 5.3 Increase jurisdictions ability to communicate/direct emergency services and resources to the hazard areas.

ACTION 5.3.1 Upgrade Emergency Services communication equipment to allow easier communication among all agencies.

Benefits: This action will not reduce the risk, but it will have 2 important benefits. (1) Communications equipment would facilitate communications among responders from different agencies, utilizing different types and frequencies of radios. (2) it would provide for a direct communication from the EOC that controls resources to the responders at the scene of a disaster.

Jurisdiction(s): ALL
Estimated Costs: $250,000-$300,000/county
Category of Action: Emergency Services
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method: Homeland Security Grants, First Responder Grants, FEMA Fire Act Grants

ACTION 5.3.2 Design and Implement a protection program for critical information systems and infrastructure.

Benefits: Each jurisdiction relies on its information systems and infrastructure. Loss of these would result in major impacts and interruptions to all emergency responders responding to a disaster. This action will enhance the city's ability to avoid a disastrous event to critical information systems and infrastructure, thus minimizing the impacts/ interruptions to city services. This action will assess weaknesses/strengths and design a program that will reduce losses to the information systems.

Jurisdictions: ALL
Category of Action: Emergency Services
Estimated Costs: $20,000/county
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method: Pre-Disaster Mitigation Grants

GOAL #6: TRAIN VOLUNTEERS TO SUPPORT/IMPLEMENT MITIGATION ACTIVITIES TO ENHANCE THE RESPONSE CAPABILITIES OF THE LOCAL JURISDICTIONS.

Objective 6.1 Train volunteers to support/ implement mitigation activities to enhance response capabilities.

ACTION 6.1.1 Recruit and Train volunteers to serve on the Community Emergency Response Team.

Benefits: These volunteers will be called upon to supplement existing professional staff in the delivery of emergency related services. These volunteers will deliver emergency preparedness presentations, maintain a database of disaster relief resources, support public safety officials with evacuations, staffing for relief centers, and aid in damage assessment teams.

Jurisdiction(s): ALL
Category of Action: Prevention
Estimated Costs: $20,000/county
Hazard(s) Mitigated: ALL Identified Hazards
Funding Method: Pre-Disaster Mitigation Grants

Funding Issues: All of the above listed goals, objectives and actions were based on the review and conclusion of the Hazard Profiles and Risk Assessments developed by the local committees and approved by the regional committee. Overall ability to fund any projects will rely heavily upon each county's government's ability to obtain funding from other sources

5.4 IMPLEMENTATION OF MITIGATION MEASURES

The mitigation committees in each county were responsible for prioritizing actions for each of its jurisdictions. The ability to describe the implementation and administration of the mitigation activities became adherent after developing the capabilities charts for each jurisdiction. This section addresses the overall risk to life and property, ease of implementation, and funding availability. The actions were also evaluated based on cost-effectiveness, environmental soundness and technical feasibility.

Again, while developing the capability charts, it was determined that most cities did not have the fiscal resources or personnel to insure that the mitigation plan's implementation could be achieved. Therefore, most of the financial responsibility will fall upon each county government.

The following charts show the implementation plan and the priorities for each county and city jurisdiction. These charts list the action plan chosen by that county and its jurisdictions and list the benefit review of these actions. The county committee members determined the overall priority and which actions were relevant to its own risk assessment findings.

COUNTY PROJECTS

FLOYD COUNTY MITIGATION PROJECTS

	ESTIMATED PROJECT COST		
PROJECT DESCRIPTION [HAZARDS ADDRESSED]	**>$1 MILLION**	**<$1 - >$5 MILLION**	**<$10 MILLION**
Funding for potentially impacted utility lines to critical facilities. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Purchase generators w/auto transfer switches for use at critical facilities. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Purchase a generator for the EOP Center. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
Improve drainage problems/culverts throughout the county. [Flooding; Dam Failure]			X
Relocate vulnerable pump stations/lift stations throughout the county. [Flooding; Dam Failure]		X	
Relocate vulnerable utility lines throughout the county. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Replace outdated turnout gear for all county fire departments. [Wildfires]	X		

PIKE COUNTY MITIGATION PROJECTS

	ESTIMATED PROJECT COST		
PROJECT DESCRIPTION	**>$1 MILLION**	**<$1 - >$5 MILLION**	**<$10 MILLION**
Funding for potentially impacted utility lines to critical facilities. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
3 portable generators w/auto transfer switches for use at critical facilities. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
2 large generators for Mountain Water's raw intake and purification plants. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Complete countywide sirens improvements. [Tornadoes]	X		
Construct a centralized road salt barn and loading station. [Severe Winter Storms]		X	
Generator for the EOP Center. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
Generators for 8 warning/emergency shelters. [Tornadoes]		X	
Improve drainage problems located in Cedar Creek. [Flooding]		X	
[40]Pikeville Pond levee improvements/improve excess water discharge. [Dam Failure; Flooding]		X	X

[40] There are a few options to improve the issue dependent on a professional engineering report and those vary drastically in cost.

Relocate vulnerable pump stations throughout the county. [Flooding; Dam Failure]		X	
Relocate vulnerable utility lines throughout the county. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	

JOHNSON COUNTY MITIGATION PROJECTS

	ESTIMATED PROJECT COST		
PROJECT DESCRIPTION	**>$1 MILLION**	**<$1 - >$5 MILLION**	**<$10 MILLION**
Funding for potentially impacted utility lines to critical facilities. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
2- Generators up grades w/auto transfer switches for use at critical facilities. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
1- Large generator for Paintsville Utilities sewage purification plants. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes; Flooding]	X		
Complete countywide warning sirens improvements. [Tornadoes]	X		
Generators for 8 warning/emergency shelters [Tornadoes]		X	
Generators for 6 Paintsville Utilities county pump stations [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		

MAGOFFIN COUNTY MITIGATION PROJECTS

	ESTIMATED PROJECT COST		
PROJECT DESCRIPTION	**$0-$50,000**	**<$50,001-$100,00**	**<$100,000**
Install emergency generator at North Magoffin Fire Dept. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
Install emergency generator at Middle Fork Fire Dept. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
Install emergency generator at South Magoffin Fire Dept. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
Install emergency generator at the Community Center. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Install emergency generator at First Baptist Church. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Install emergency generator at Salyersville Nursing Home [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]		X	
Install emergency generator at Dist. 3 Fire Dept. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		
Install emergency generator at Bloomington Fire Dept. [Thunderstorms/Wind Events; Severe Winter Storms; Tornadoes]	X		

Mitigate 8 foot culvert located at North Magoffin Fire Dept. Install aluminum box culvert to mitigate flooding. [Flooding]	X		
Mitigate 8 foot culvert located at South entrance of Mudlick Branch. Install aluminum box culvert to mitigate flooding issues. [Flooding]	X		

MARTIN COUNTY MITIGATION PROJECTS

	ESTIMATED PROJECT COST		
[41]PROJECT DESCRIPTION	>$1 MILLION	<$1 - >$5 MILLION	<$10 MILLION
Raise/reroute RT 292, Riverfront Road. [Flooding]			X
Raise/reroute RT 292, "Calf Creek Dip". [Flooding]			X
Raise/reroute RT 292 at the mouth of Turkey Creek [Flooding]			X
Raise/reroute RT 292 at Hode Road/Wards Trailer Park. [Flooding]			X
Raise 3 bridges along RT 40. [Flooding]		X	
Clean creek along RT 40. [Flooding]	X		

*The Martin County Mitigation Committee declared these areas and these projects as their main priority. The county faces major issues alleviating the problems with the above projects due to their extreme cost. Even discussing the methods in which to repair the issues with RT 292 would require an engineering firm to analyze the best method to mitigate the repetitive flooding as rerouting the road may be more feasible than raising the entire roadway out of the flooding prone areas or mitigating the flooding by constructing flood walls. The mitigation committee gave an educated guess as to the potential cost any of these projects but due to the sheer size and complicated nature of them the current cost is unknown. An engineering firm would need to perform a lengthy study and analysis to give an actual quote on the cost of these projects.

5.5 MULTI-JURISDICTIONAL MITIGATION STRATEGY

Although this plan lists each jurisdiction's findings by county, this plan is to be reviewed as a regional approach to addressing each jurisdictions mitigation programs. This plan was reviewed and reflects revisions made by FEMA and KYEM. The actions were based upon the findings of the risks identified in the risk assessment section and mitigation strategies established by the county committees and regional committees. The cities have joined with the county governments to help fund mitigation actions that are cost-effective, environmentally sound and technically feasible. Local Emergency Planning Committees (LEPC) will also work together with the County Emergency Managers and the Regional Emergency Manager and Big Sandy ADD staff as to implement mitigation actions where feasible on a regional level that will include all jurisdictions.

MITIGATION STRATEGY SUMMARY

Above are the newest, specific projects that the counties comprising the Big Sandy region intend to pursue in response to its hazard identification and risk assessment. These actions have been generalized and placed within a list of existing mitigation actions in Chapter 7, Section 7.1 in order to systematize and allow space for prioritization (according to criteria described in Section 7.2) and to account for progress with current mitigation action efforts.

As regional representative for Floyd, Johnson, Magoffin, Martin, and Pike counties and for the cities therein, Big Sandy Area Development District also puts forward the following general mitigation actions that it feels will be of relevance to its jurisdictions even if not immediately a concern. Big Sandy ADD cannot predict if the following action categories will be pursued in between this 2016 update and a future five-year update. Big Sandy ADD does not assume a means of funding the below-mentioned activities. However, the planning process did justify the risk assessment and the following actions are means by which to mitigate further the assessed risks.

[41] These projects are all circled on the Martin County flood maps located in the flooding section.

BIG SANDY ADD-IDENTIFIED MITIGATION MEASURES FOR THE REGION

Mitigation Measure	Hazard(s) Addressed
Acquisitions	Landslides; Flooding
Water Supply Retrofitting	Drought
Landscape Enhancement	Drought; Flooding
Bracing of Generators	Tornadoes; Earthquakes
Retrofitting	Tornadoes; Earthquakes
The Use of Flexible Piping	Flooding; Landslides; Earthquakes
Pursuing Community Rating System (CRS)	Flooding
Systematizing Tracking High-Water Marks	Flooding
Improving Mapping/GIS Capabilities	Flooding; Dam Failure; Landslides; Earthquakes
Elevating Properties/Generators	Flooding
Protecting/Preserving Wetlands	Flooding
Soil Stabilization, inc. Vegetative Management	Landslides
Regulating Development	Landslides; Flooding
Identifying Critical Facilities, esp. Mapping/GIS	Landslides; Flooding
Installing Community Safe Rooms, both Standalone and Retrofitted	Tornadoes; Thunderstorms/Wind Events
Installing Structure-Specific, External Water Hydration Systems (Sprinklers)	Wildfire
Protecting External Fuel Sources	Wildfire

CHAPTER 6: PLAN MAINTENANCE PROCEDURES

6.1 MONITORING, EVALUATING AND UPDATING THE PLAN

The mitigation workgroups decided that the plan maintenance process outlined in the previous (2011) hazard mitigation plan update had been successful in maintaining risk identification and mitigation strategies. Thus, local emergency managers will continue to assume responsibility of the plan upon adoption and will be responsible for coordinating with the LEPC or other regular scheduled committee meetings to monitor plan activities on the county level. These committees will be utilized in the monitoring, evaluating and updating processes. To reiterate the plan maintenance process:

PLAN MONITORING: Periodically, the County Emergency Manager will solicit feedback from agencies responsible for various implementation actions on progress of the actions to date; this may be done either through phone calls, site visits or other methods. County Emergency Managers will then present their findings at the next regularly scheduled LEPC or other scheduled committee meeting.

PLAN EVALUATION: The Emergency Management Director will facilitate plan evaluation as part of the meeting agenda. The results of the emergency management director's monitoring reports will serve as the basis for the evaluation. The committee will review each goal/objective to determine their relevance/effectiveness in light of changes and any new developments. They will assess: (1) whether planned actions address current/expected conditions (2) whether the nature/magnitude of risks has changed; and (3) availability of current/expected resources for implementing the actions. The LEPC will make recommendations to the Big Sandy ADD Staff for any necessary changes in the course of action based on their evaluation in light of the above criteria.

PLAN UPDATE: Plan updates will be based on monitoring results and evaluation of those results. The Big Sandy ADD Staff will guide the update process and will submit the updated plan to the State Hazard Mitigation Officer (SHMO). This will allow the KYEM and FEMA to review, make changes and approve of the maintenance changes. Formal adoption from each jurisdiction will occur after the changes have been made, but prior to approval by KYEM and FEMA.

PLAN IMPLEMENTATION: This plan has been distributed to each County Emergency Manager and kept available at the Big Sandy ADD office. Upon completion/approval, the updated plan should be more widely adopted into the various planning efforts of each separate entity in the BSADD ADD region and serve as a continued documentation effort on possible solutions to reoccurring hazards.

BIG SANDY ADD'S CONTINUED INVOLVEMENT: Big Sandy ADD will offer their facilities for meetings and assistance with the plan. Big Sandy ADD's Staff will be available to the county emergency managers and local committees on an as needed

basis. Big Sandy ADD staff will be proactive in soliciting funding for administrative activities as well as funding for mitigation actions as outlined in the plan.

6.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS

The BSADD service area jurisdictions utilize a variety of authorities, policies and programs to guide and control development. The number of authorities, policies and programs in this plan vary from jurisdiction to jurisdiction. When the mitigation plan is adopted by each jurisdiction, mitigation strategies in this plan will be integrated into each jurisdiction's existing programs, plans and ordinances where appropriate and as determined by these local jurisdictions.

After the plan is adopted, public officials will require their respective jurisdictions to address hazards that were identified in the plan when developing their current/future community planning and land use regulations. The County Emergency Manager's responsibility for each jurisdiction will be to insure the plan's actions are included in the development of local plans and provide technical assistance to the agencies responsible for the existing authorities in implementing these requirements. If problems arise, Big Sandy ADD Staff can step in as advisor for the jurisdictions and provide technical assistance where needed.

By adopting this plan, each local jurisdiction accepts the responsibility to implement the strategies and actions of this plan as it does with all other community development plans and activities where applicable and to incorporate the requirements of this plan into other plans as appropriate within the first year of plan adoption. The only current mechanism that is known to make use of the Regional Hazard Mitigation Plan is the Comprehensive Economic Development Strategy (CEDS) Plan. Additionally, this plan will be made available to the various groups and organizations allowing them to incorporate areas of this plan as needed, such as water councils, MPO's, transportation committees, school boards, city/county government.

C. CONTINUED PUBLIC INVOLVEMENT

The Big Sandy ADD Staff is dedicated to continuing public involvement with the ever-changing aspects of this document and related mitigation strategies. The plan was created with much support from local committee members of each jurisdiction and public participation. The Big Sandy ADD predicts that for this 2016 update's maintenance, LEPC meetings will be the venue for semi-annual plan evaluations: Each county advertises significantly for these meetings in compliance with the open meeting regulations.

As in the past, the Regional Hazard Mitigation Plan will be catalogued and kept on hand at all emergency management offices in each county in addition to being made available for review at public meetings. Copies will also be available to the public at the county Judge/Executive's office during regular business hours and Big Sandy ADD office upon request. For this 2016 update, The Big Sandy ADD website (www.bigsandy.org) will contain and maintain information about the plan. It will tell how the public can obtain and review copies, how the public can propose any changes to the plan, and contain contact information for the county emergency managers

CHAPTER 7: APPENDIX

7.1 MITIGATION ACTION PRIORITIZATION AND BENEFIT REVIEW

FLOYD COUNTY ***Mitigation Actions Prioritization and Benefit Review*** ***(Includes Allen, Martin, Prestonsburg, Wayland and Wheelwright)***								
Action number	**ACTION**	**Effect on Overall Risk to Life & Property**	**Ease of Implementation**	**Cost/Benefit 1 - High 2- Medium 3-Low**	**Overall Priority**	**Description 1- Ongoing 2- Completed 3- Deleted 4- Deferred**	**Implementation Time**	**Agency Responsible**
1.1.1	Remove Debris from Streams that cause damages to bridge and transportation facilities	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart./ Emergency Mgmt.
1.1.1	Improve the county's ability for debris removal through the purchase of new equipment.	Very High	Very Difficult	High	High	Deferred- Lack Of Funds	2-5 years	Road Depart. / Emergency Mgmt
1.1.1	Improve and replace hazardous bridges and culverts throughout the county.	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart. / Emergency Mgmt
1.1.2	Reduce reoccurring flooding hazards with engineering studies.	Very High	Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.
1.1.3	Develop a coordinated, interagency sustained debris removal plan	High	Hard	Very High	Very High	Deferred – Lack Of Funds	2-year	Road Depart. / Emergency Mgmt.
1.1.4	Establish emergency disaster relief warehouse/station	Very High	Easy	Medium	Very High	Deferred – Lack Of Funds	1-2 years	Emergency Mgmt. / Fire Dept..
1.2.1	Work with utility companies to trim trees and debris away from overhead power lines.	Very High	Difficult	Low	Very High	Ongoing	Annually	Utility Companies
1.2.2	Provide Generators at Critical facilities that provide emergency services.	Very High	Hard	High	High	Ongoing	2 years	Emergency Mgmt.
1.5.1	Evaluate current dams/levees. Review specifications for dams, including certification, restoration and repair.	Very High	Difficult	High	High	Deferred – Lack Of Funds	5-10 years	Judge Executive Office
1.6.1	Improve first responder rescue equipment, Communications, flood rescue.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.1	Reduce the numbers of critical facilities in identified hazard areas.	Very High	Hard	High	Very High	Ongoing	Annually	Emergency Mgmt.

2.2.1	Purchase Severe Repetitive Loss Structures throughout the county.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt./Floodplain Coordinator
3.1.1	Enforce and continue to develop floodplain ordinances and educate residents on NFIP.	High	Hard	Low	High	Ongoing	Annually	Floodplain Coordinator
4.1.1	Educate residents of their location in the Hazard areas by providing maps and information.	High	Easy	Medium	High	Ongoing	Immediate	Emergency Mgmt.
4.1.3	Promote the use of NOAA 'all hazards' radios for early warning and post event information.	Very High	Easy	Low	Very High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
4.2.1	Develop supplemental evacuation plans for all hazards to be included in the county's EOP.	High	Medium	Medium	High	Ongoing	2 years	Emergency Mgmt.
5.2.2	Create a GIS floodplain database denoting flooding clean-up areas from engineered studies.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	FEMA / BSADD / PVA / Insurance
5.3.1	Upgrade the emergency services communication equipment.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	3-5 years	Emergency Mgmt.
5.3.2	Design and implement a protection program for critical information systems.	High	Very Difficult	High	High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
6.1.2	Recruit and train medical response teams.	Very High	Very Difficult	Medium	High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.

PIKE COUNTY

Mitigation Actions Prioritization and Benefit Review

(Includes Coal Run, Elkhorn City and Pikeville)

Action number	ACTION	Effect on Overall Risk to Life & Property	Ease of Implementation	Cost/Benefit 1 - High 2- Medium 3-Low	Overall Priority	Description 1- Ongoing 2- Completed 3- Deleted 4- Deferred	Implementation Time	Agency Responsible
1.1.1	Remove Debris from Streams that cause damages to bridge and transportation facilities	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart./ Emergency Mgmt.
1.1.1	Improve the county's ability for debris removal through the purchase of new equipment.	Very High	Very Difficult	High	High	Deferred- Lack Of Funds	2-5 years	Road Depart. / Emergency Mgmt
1.1.1	Improve and replace hazardous bridges and culverts throughout the county.	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart. / Emergency Mgmt
1.1.2	Reduce reoccurring flooding hazards with engineering studies.	Very High	Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.
1.1.3	Develop a coordinated, interagency sustained debris removal plan	High	Hard	Very High	Very High	Deferred – Lack Of Funds	2-year	Road Depart. / Emergency Mgmt.
1.1.4	Establish emergency disaster relief warehouse/station	Very High	Easy	Medium	Very High	Deferred – Lack Of Funds	1-2 years	Emergency Mgmt. / Fire Dept..
1.2.1	Work with utility companies to trim trees and debris away from overhead power lines.	Very High	Difficult	Low	Very High	Ongoing	Annually	Utility Companies
1.2.2	Provide Generators at Critical facilities that provide emergency services.	Very High	Hard	High	High	Ongoing	2 years	Emergency Mgmt.
1.5.1	Evaluate current dams/levees. Review specifications for dams, including certification, restoration and repair.	Very High	Difficult	High	High	Deferred – Lack Of Funds	5-10 years	Judge Executive Office
1.6.1	Improve first responder rescue equipment, Communications, flood rescue.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.1	Reduce the numbers of critical facilities in identified hazard areas.	Very High	Hard	High	Very High	Ongoing	Annually	Emergency Mgmt.
2.2.1	Purchase Severe Repetitive Loss Structures throughout the county.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt./Floodplain Coordinator
2.2.1	Improve the overall storm water drainage in Pikeville and all Pike County cities.	Very High	Very Difficult	High	High	Ongoing	Annually	Emergency Mgmt./Floodplain Coordinator
3.1.1	Enforce and continue to develop floodplain ordinances and educate residents on NFIP.	High	Hard	Low	High	Ongoing	Annually	Floodplain Coordinator

4.1.1	Educate residents of their location in the Hazard areas by providing maps and information.	High	Easy	Medium	High	Ongoing	Immediate	Emergency Mgmt.
4.1.3	Promote the use of NOAA 'all hazards' radios for early warning and post event information.	Very High	Easy	Low	Very High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
4.2.1	Develop supplemental evacuation plans for all hazards to be included in the county's EOP.	High	Medium	Medium	High	Ongoing	2 years	Emergency Mgmt.
5.2.2	Create a GIS floodplain database denoting flooding clean-up areas from engineered studies.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	FEMA / BSADD / PVA / Insurance
5.3.1	Upgrade the emergency services communication equipment.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	3-5 years	Emergency Mgmt.
5.3.2	Design and implement a protection program for critical information systems.	High	Very Difficult	High	High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
6.1.2	Recruit and train medical response teams.	Very High	Very Difficult	Medium	High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.

JOHNSON COUNTY

Mitigation Actions Prioritization and Benefit Review
(Includes Paintsville)

Action number	ACTION	Effect on Overall Risk to Life & Property	Ease of Implementation	Cost/Benefit 1 - High 2- Medium 3-Low	Overall Priority	Description 1- Ongoing 2- Completed 3- Deleted 4- Deferred	Implementation Time	Agency Responsible
1.1.1	Remove Debris from Streams that cause damages to bridge and transportation facilities	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart./ Emergency Mgmt.
1.1.1	Improve the county's ability for debris removal through the purchase of new equipment.	Very High	Very Difficult	High	High	Deferred- Lack Of Funds	2-5 years	Road Depart. / Emergency Mgmt
1.1.1	Improve and replace hazardous bridges and culverts throughout the county.	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart. / Emergency Mgmt
1.1.2	Reduce reoccurring flooding hazards with engineering studies.	Very High	Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.
1.1.3	Develop a coordinated, interagency sustained debris removal plan	High	Hard	Very High	Very High	Deferred – Lack Of Funds	2-year	Road Depart. / Emergency Mgmt.
1.1.4	Establish emergency disaster relief warehouse/station	Very High	Easy	Medium	Very High	Deferred – Lack Of Funds	1-2 years	Emergency Mgmt. / Fire Dept..
1.2.1	Work with utility companies to trim trees and debris away from overhead power lines.	Very High	Difficult	Low	Very High	Ongoing	Annually	Utility Companies
1.2.2	Provide Generators at Critical facilities that provide emergency services.	Very High	Hard	High	High	Ongoing	2 years	Emergency Mgmt.
1.5.1	Evaluate current dams/levees. Review specifications for dams, including certification, restoration and repair.	Very High	Difficult	High	High	Deferred – Lack Of Funds	5-10 years	Judge Executive Office
1.6.1	Improve first responder rescue equipment, Communications, flood rescue.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.1	Reduce the numbers of critical facilities in identified hazard areas.	Very High	Hard	High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.2	Purchase Severe Repetitive Loss Structures throughout the county.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt./Floodplain Coordinator
3.1.1	Enforce and continue to develop floodplain ordinances and educate residents on NFIP.	High	Hard	Low	High	Ongoing	Annually	Floodplain Coordinator
4.1.1	Educate residents of their location in the Hazard areas by providing maps and information.	High	Easy	Medium	High	Ongoing	Immediate	Emergency Mgmt.

4.1.3	Promote the use of NOAA 'all hazards' radios for early warning and post event information.	Very High	Easy	Low	Very High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
4.2.1	Develop supplemental evacuation plans for all hazards to be included in the county's EOP.	High	Medium	Medium	High	Ongoing	2 years	Emergency Mgmt.
5.2.2	Create a GIS floodplain database denoting flooding clean-up areas from engineered studies.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	FEMA / BSADD / PVA / Insurance
5.3.1	Upgrade the emergency services communication equipment.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	3-5 years	Emergency Mgmt.
5.3.2	Design and implement a protection program for critical information systems.	High	Very Difficult	High	High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
6.1.2	Recruit and train medical response teams.	Very High	Very Difficult	Medium	High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.

MAGOFFIN COUNTY

Mitigation Actions Prioritization and Benefit Review
(Includes Salyersville)

Action number	ACTION	Effect on Overall Risk to Life & Property	Ease of Implementation	Cost/Benefit 1 - High 2- Medium 3-Low	Overall Priority	Description 1- Ongoing 2- Completed 3- Deleted 4- Deferred	Implementation Time	Agency Responsible
1.1.1	Remove Debris from Streams that cause damages to bridge and transportation facilities	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart./ Emergency Mgmt.
1.1.1	Improve the county's ability for debris removal through the purchase of new equipment.	Very High	Very Difficult	High	High	Deferred- Lack Of Funds	2-5 years	Road Depart. / Emergency Mgmt
1.1.1	Improve and replace hazardous bridges and culverts throughout the county.	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart. / Emergency Mgmt
1.1.2	Reduce reoccurring flooding hazards with engineering studies.	Very High	Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.
1.1.3	Develop a coordinated, interagency sustained debris removal plan	High	Hard	Very High	Very High	Deferred – Lack Of Funds	2-year	Road Depart. / Emergency Mgmt.
1.1.4	Establish emergency disaster relief warehouse/station	Very High	Easy	Medium	Very High	Deferred – Lack Of Funds	1-2 years	Emergency Mgmt. / Fire Dept..
1.2.1	Work with utility companies to trim trees and debris away from overhead power lines.	Very High	Difficult	Low	Very High	Ongoing	Annually	Utility Companies
1.2.2	Provide Generators at Critical facilities that provide emergency services.	Very High	Hard	High	High	Ongoing	2 years	Emergency Mgmt.
1.5.1	Evaluate current dams/levees. Review specifications for dams, including certification, restoration and repair.	Very High	Difficult	High	High	Deferred – Lack Of Funds	5-10 years	Judge Executive Office
1.6.1	Improve first responder rescue equipment, Communications, flood rescue.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.1	Reduce the numbers of critical facilities in identified hazard areas.	Very High	Hard	High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.2	Purchase Severe Repetitive Loss Structures throughout the county.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt./Floodplain Coordinator
3.1.1	Enforce and continue to develop floodplain ordinances and educate residents on NFIP.	High	Hard	Low	High	Ongoing	Annually	Floodplain Coordinator
4.1.1	Educate residents of their location in the Hazard areas by providing maps and information.	High	Easy	Medium	High	Ongoing	Immediate	Emergency Mgmt.

4.1.3	Promote the use of NOAA 'all hazards' radios for early warning and post event information.	Very High	Easy	Low	Very High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
4.2.1	Develop supplemental evacuation plans for all hazards to be included in the county's EOP.	High	Medium	Medium	High	Ongoing	2 years	Emergency Mgmt.
5.2.2	Create a GIS floodplain database denoting flooding clean-up areas from engineered studies.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	FEMA / BSADD / PVA / Insurance
5.3.1	Upgrade the emergency services communication equipment.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	3-5 years	Emergency Mgmt.
5.3.2	Design and implement a protection program for critical information systems.	High	Very Difficult	High	High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
6.1.2	Recruit and train medical response teams.	Very High	Very Difficult	Medium	High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.

MARTIN COUNTY

Mitigation Actions Prioritization and Benefit Review
(Includes Inez and Warfield)

Action number	ACTION	Effect on Overall Risk to Life & Property	Ease of Implementation	Cost/Benefit 1 - High 2- Medium 3-Low	Overall Priority	Description 1- Ongoing 2- Completed 3- Deleted 4- Deferred	Implementation Time	Agency Responsible
1.1.1	Remove Debris from Streams that cause damages to bridge and transportation facilities	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart./ Emergency Mgmt.
1.1.1	Improve the county's ability for debris removal through the purchase of new equipment.	Very High	Very Difficult	High	High	Deferred- Lack Of Funds	2-5 years	Road Depart. / Emergency Mgmt
1.1.1	Improve and replace hazardous bridges and culverts throughout the county.	Very High	Very Difficult	Very High	Very High	Ongoing	Annually	Road Depart. / Emergency Mgmt
1.1.2	Reduce reoccurring flooding hazards with engineering studies.	Very High	Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.
1.1.3	Develop a coordinated, interagency sustained debris removal plan	High	Hard	Very High	Very High	Deferred – Lack Of Funds	2-year	Road Depart. / Emergency Mgmt.
1.1.4	Establish emergency disaster relief warehouse/station	Very High	Easy	Medium	Very High	Deferred – Lack Of Funds	1-2 years	Emergency Mgmt. / Fire Dept..
1.2.1	Work with utility companies to trim trees and debris away from overhead power lines.	Very High	Difficult	Low	Very High	Ongoing	Annually	Utility Companies
1.2.2	Provide Generators at Critical facilities that provide emergency services.	Very High	Hard	High	High	Ongoing	2 years	Emergency Mgmt.
1.5.1	Evaluate current dams/levees. Review specifications for dams, including certification, restoration and repair.	Very High	Difficult	High	High	Deferred – Lack Of Funds	5-10 years	Judge Executive Office
1.6.1	Improve first responder rescue equipment, Communications, flood rescue.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.1	Reduce the numbers of critical facilities in identified hazard areas.	Very High	Hard	High	Very High	Ongoing	Annually	Emergency Mgmt.
2.1.2	Purchase Severe Repetitive Loss Structures throughout the county.	Very High	Difficult	Very High	Very High	Ongoing	Annually	Emergency Mgmt./Floodplain Coordinator
3.1.1	Enforce and continue to develop floodplain ordinances and educate residents on NFIP.	High	Hard	Low	High	Ongoing	Annually	Floodplain Coordinator
4.1.1	Educate residents of their location in the Hazard areas by providing maps and information.	High	Easy	Medium	High	Ongoing	Immediate	Emergency Mgmt.

4.1.3	Promote the use of NOAA 'all hazards' radios for early warning and post event information.	Very High	Easy	Low	Very High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
4.2.1	Develop supplemental evacuation plans for all hazards to be included in the county's EOP.	High	Medium	Medium	High	Ongoing	2 years	Emergency Mgmt.
5.2.2	Create a GIS floodplain database denoting flooding clean-up areas from engineered studies.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	5-10 years	FEMA / BSADD / PVA / Insurance
5.3.1	Upgrade the emergency services communication equipment.	Very High	Very Difficult	Very High	Very High	Deferred – Lack Of Funds	3-5 years	Emergency Mgmt.
5.3.2	Design and implement a protection program for critical information systems.	High	Very Difficult	High	High	Deferred – Lack Of Funds	Immediate	Emergency Mgmt.
6.1.2	Recruit and train medical response teams.	Very High	Very Difficult	Medium	High	Deferred – Lack Of Funds	5-10 years	Emergency Mgmt.

7.2 EXPLANATION OF MITIGATION ACTION RANKINGS AND PRIORITY RANKINGS

Ease of Implementation Rankings

- **Easy** – Rarely is there a project with this ranking. Projects with this ranking are typically implemented quickly and with no resistance or obstacles.
- **Difficult** – Projects with this ranking may require increased effort or increased financial complications that may make completing the project more of a challenge.
- **Very Difficult** – Projects with this ranking may have a higher level of public pushback and may be complicated by a high cost and financial complications.
- **Hard** – Projects with this ranking either have a high level of public pushback or a very high financial cost that make completing projects with this ranking so hard.

Overall Priority Rankings

- **Low** – Projects with low priority will have a small impact on the service area or are not as needed as projects with a larger impact.
- **Medium** – These projects are needed and would have a positive impact but aren't as critical and/or doesn't have the same level of positive impact as projects ranked above it.
- **High** – These projects have an impact on a large area and would provide a large benefit if they were completed.
- **Very High** – These projects are critical and would have a large positive impact for a region. These projects would provide a large public benefit and typically involve projects dealing with flooding or first responders.

7.3 PIKE COUNTY FLOODPLAIN MANAGEMENT PLAN

PIKE COUNTY FLOODPLAIN MANAGEMENT
PIKE COUNTY COURTHOUSE
146 MAIN STREET
PIKEVILLE, KY 41501

PIKE COUNTY FLOODPLAIN MANAGEMENT PLAN

1.1 INTRODUCTION

Pike County has been identified by the Federal Emergency Management Agency (FEMA) as having a repetitive flooding problem. The County has 71 repetitive loss properties (down from 115 at the start) that are located all across the county, along three rivers (Tug Fork, Levisa Fork of the Big Sandy, and Russell Fork of the Big Sandy), and several large creeks (Shelby Creek, Johns Creek, Pond Creek, Peter Creek, and Blackberry Creek) and small streams. A repetitive loss property is one for which two or more claims of $1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given 10-year period since 1978. In mid 1999, the Pike County Floodplain Coordinator was advised that a floodplain management plan had to be adopted for the county to stay in the Community Rating System (CRS). This plan must be in place by the next recertification. This program gives the property owners of Pike County that have flood insurance policies a discount on their flood insurance premiums. This was discussed with the County Judge Executive and agreed that a plan be put in place. The Floodplain Coordinator was appointed to undertake the planning process and implement the floodplain management plan.

In November of 1999, the Floodplain Coordinator started organizing to put the plan together. By 2000 the plan was put together and implemented. In 2007 the Floodplain Coordinator started revising the existing plan along with some help from the United States of Army Corps of Engineers. Several goals have been meet from the original plan and will be addressed in the revised plan. Also attached is the Army Corps of Engineers Floodplain Management Plan as Appendix “A”.

2.1 BACKGROUND

Latitude 37° 27’ 51”, Longitude -82° 31’ 35”, Pike County is the easternmost county in Kentucky. It is a predominately rural county, bordered by West Virginia to the northeast and Virginia to the southeast. It was formed in 1821 and named in honor of General Zebulon M. Pike. The County seat was established opposite the mouth of Lower Chloe Creek and was called Piketon (later Pikeville). Due to the economic prosperity associated with coal production, the county population grew from 49,677 in 1920 to 72,582 in 1998 census. It lies in the Kanawha area of the Appalachian Plateau, one of the richest coal mining areas of the United States. The economy of the county is heavily dependent on the coal mining industry. The population of the county was 61,333 in 1990 and 68,736 in 2000. Between 1950 and 1970, the population declined 25 percent to 61, 059 as mechanization and a shift in demand from coal to oil reduced employment. Between 1970 and 1980, population increased 33 percent to 81,123 as higher coal production made more jobs available. Ninety percent of the current population resides in the unincorporated areas.

Pikeville, Village of Coal Run, and Elkhorn City are the three municipalities in the county. They have their own floodplain management programs. The total land area contained within Pike County is approximately 788 square miles. Pike County has an irregular shape and borders

Martin County, Kentucky to the north, Buchanan County Virginia to the south, and Knott County and Letcher County Kentucky to the west.

The major industry in the county is mining, which is throughout the county. The county's greatest asset is its rich deposits of high-grade bituminous coal. Based on 1978 figures from the U.S. Department of Mines, the demonstrated reserve base is estimated at 2,674.8 million tons. Total recoverable coal is estimated at 835.9 million tons, with underground recoverable coal estimated at 553.3 million tons, and surface recoverable coal at 272.6 million tons. County production, which declined in the 1950s and early 1960s, increased through the 1960s and fluctuated during the 1970s, steadily grew through the 1980s and 1990s and reached its highest production year in 1999 when 35,725,282 tons were produced. Underground production in 1999 accounted for 20,064,639 tons (56 percent), and surface mining for 15,660,643 tons (44 percent). Almost 19,000 acres of land have been disturbed by surface mining in Pike County since 1954 to 1978. Several thousand acres since then have been disturbed. Logging of timber has now become a small industry in the county. U.S. Highway 23, U.S. Highway 119, State Highway 460 / 80 are the major highways in the county.

3.1 HAZARD ASSESSMENT

Pike County has approximately 14,000 buildings in the floodplain of its 25 creeks and rivers. These creeks can flood at any given time, and there are several smaller streams that can flood also.

Source of Problem: Pike County lies in the Big Sandy River Basin, one of the major tributaries of the Ohio River and has a total watershed area of 4,283 square miles. Levisa Fork, a tributary of the Big Sandy River, flows northwesterly through the county, and drains its central and western portions. Levisa Fork drains approximately 1250 square miles. Tug Fork, also a tributary of the Big Sandy River, forms the eastern boundary with Mingo County, West Virginia. Tug Fork drains approximately 1000 square miles. Russell Fork, a major tributary of the Levisa Fork, lies in southern Pike County and drains approximately 700 square miles. Also there are approximately 25 to 30 smaller creeks, which drain 1 square mile to 115 square miles, the average being approximately 30 square miles.

Pike County lies in a rugged portion of the Appalachian Plateau, characterized by sharp ridges and narrow valleys. Streams are often entrenched in the lower basins. Elevations range from less than 700 feet to over 2300 feet, and the drainage patterns ate intricate. Cliffs are common, and steep inclines of greater than 40 percent slope cover 90 percent of Pike County.
There is a shortage of level land suitable for development in the county because of the steep slopes and narrow valleys. Most land suitable for construction is either restricted by coal rights or inflated in price because of scarcity and high demand. Due to this, roads and settlement patterns generally follow the streams with rail lines on one side of the valley and roads on the other. Housing, therefore, is often situated in the floodplain, on steep slopes, or in other inappropriate locations. The towns and villages of Pike County are comparatively small, and mostly located along the main streams. Most flood damage occurs in isolated pockets of development.

- **Flood Data:** There has been a detailed study of flooding on the majority of these creeks. These areas are shown as " AE Zones " on the county's Flood Insurance Rate Maps (FIRM) which means that the floodplain lines and floodway lines have been established, with Base Flood Elevations (BFE). Base flood elevations show the elevation of the height of the water if a 100-year flood should occur. FIRM Maps also have "A Zones", which means that these areas are identified as a base (100-year) floodplain but no flood elevations are given.

- **Flooding History:** The history of flooding along the rivers and streams in Pike County indicates that flooding could occur during any season of the year. Large frontal storms or decaying tropical storms produce the worst flooding along the larger rivers and stream systems. Summer-type storms have occurred over small areas producing severe local floods without affecting adjacent areas. The mountainous topography of the basin is conducive to rapid concentration of runoff, resulting in fast rises of the streams, best described as "flash flooding".

This condition has been aggravated by widespread strip mining, timbering, and other operations that remove forest and ground cover. Floods are brief, seldom remaining above flood stage for more than 24 hours. Major floods in Pike County occurred in 1862, 1875, 1899, 1901, 1908, 1913, 1918, 1929, 1937, 1939, 1955, 1957, 1963, 1977, 1984, and 2002. The maximum flood of record on Levisa Fork occurred in January 1957, and had a stage of 54 feet at the USGS gage at Pikeville. The March 1963 flood had a stage of 51.2 feet at the gage. The April 1977 flood reached a stage of 52.8 feet. Fishtrap Dam provided over 13 feet of stage reduction during the 1977 flood, which approximated the 500-year flood. The 1977 flood was the maximum flood of record on Russell Fork and approximated the 100-year flood.

The April 1977 flood was also the maximum flood of record on the Tug Fork, and crested at 52.6 feet at the USGS gage at Williamson, WV. This flood was 25.5 feet above flood stage, had a discharge of 94,000 cubic feet per second, and approximated the 500-year flood. The April 1977 flood is the standard for the flood projects that have been completed along the Tug Fork and the Tributary Project that is ongoing at this time. The Levisa Fork Project will be to this standard also.

In 2001, 2002, and 2003 Pike County had 4 flooding events on its larger creeks and small streams county wide with damages totaling in the millions of dollars with no major flooding of the rivers. Report flooding in other year's next update

4.1 PROBLEM ASSESSMENT

a. Areas: Pike County has several areas that flood frequently throughout the county. Meta or Johnstown, Belfry, Mullins, Smith Bottom, Toler, and Winns Branch. Some of these areas have flooded as many as three times in a two week period. Others have been flooded or had water on their property as much as 20 times over a five year period.

b. Critical Facilities: Since Pike County is a rural county, no critical facilities are located out in the county. Some of the roads leading into Pikeville where the hospital is located may be blocked. Alternative routes would take approximately two hours. The hospital at South Williamson could be used if the roads are not blocked. The construction of US 119 should be finished in the fall of 2007. With the completion of this roadway which travels the ridges access to critical facilities should improve greatly.

c. Development Trends: Due to the lack of suitable land, probably half the construction is done in the floodplain. The recent law passed by the State Legislation, which requires that an approved septic system be installed before electric service can be connected, has compounded this. This limits the use of hillside property due to the lack of room for the septic system. Additions to the college, the expansion of the hospital, Tech School, convention center, and other businesses show the county to be growing. The population should grow.
The only development constraints the county has are the County's floodplain ordinance and some restrictions on subdivisions in the County's planning and zoning ordinance. The State of Kentucky has a floodplain management section in its Department of Natural Resources. The County's floodplain ordinance does not prohibit construction in the floodplain. However, it does

prohibit construction in the floodway. The county does have good mapping with flood elevations and floodways.

Pike County's floodplain ordinance only covers the unincorporated areas of Pike County. The City of Pikeville, Elkhorn City, and the Village of Coal Run have their own floodplain management. Pike County has some unnumbered A zones, but most areas are AE zones which have base flood elevations and the ordinance requires:

1. New construction, substantial improvements, and manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This standard shall be in addition to and consistent with applicable state requirements for resisting wind forces;
2. Materials used below the lowest floor are resistant to flood damage;
3. All electrical, heating, ventilating, plumbing and air conditioning equipment and utility meters are located above the flood protection elevation;
4. All water and sewer pipes, electrical and telephone lines located below the flood elevation are waterproof;
5. If walls are used, they must have permanent openings no more than one foot above grade with openings of at least on square inch for every square foot of lower area subject to flooding;

Most of the homes that have been flooded were built before 1979 when Pike County got in the program. Due to the size, terrain, and being rural makes keeping track of construction very difficult. Some measures need to be taken to control development.

5.1 PUBLIC INVOLVEMENT

Talking with the residents over the last several years and the public meetings conducted with the Army Corps of Engineers the Floodplain Manager has received some ideas of what they would like to see done. Public involvement by meetings will be sought in the future and their concerns will be implemented in the revised plan.

6.1 COORDINATION

Over the past several months meetings were held with County Emergency Management, County Road Department, 911, County GIS Mapping, FEMA, and the Army Corps of Engineers. More mapping has been discussed with FEMA, and the Army Corps of Engineers has helped with the Floodplain Management Plan.

Meetings with the public will be scheduled as soon as possible. The Floodplain Manager will coordinate with the other agencies and schedule these meetings. When the draft plan has been completed, copies will be sent to interested homeowners and agencies that have helped in the drafting of this plan.

7.1 GOALS

The following goals were established to guide this floodplain management plan and to address the flooding problems of our residents and our repetitive loss structures. The goals were reached after the meetings with the various departments.

1. Protect the structures in the county's repetitive loss areas;
2. Work to improve our outreach projects;
3. Allow no development in the floodway without HEC modeling;
4. Make sure all future development is at BFE, by an ordinance;
5. Work to obtain more credit points to lower our CRS rating to a class 8:

6. Continue working to get other areas of the county (Levisa Fork) in a flood-proofing project;
7. Keep appealing to get flood data Army Corps of Engineers have in our A Zones incorporated into Pike County's new FIRMs;
8. Acquire new equipment and software to do in field elevation before property purchases;
9. Coordinate with Congressman Rogers to secure money for planning and designing of project at Meta;
10. Floodplain Coordinator and Emergency Manager receive more and better training in flood response and planning;

8.1 REVIEW OF POSSIBLE ACTIVITIES

During the meetings with the other agencies, the Floodplain Manager reviewed a number of different floodplain management activities. They were organized under six categories.

a. **Preventive:** Planning and zoning, open space preservation, floodplain regulations, stream maintenance were all discussed. All of these methods will help minimize in flood damage in the future. Measures reviewed are:

    1. Preserving areas as open space. The county already owns several tracts of property in the floodplain areas. This can be used for parks.
    2. Rezone the remaining undeveloped property to open space to prohibit future development.
    3. Regulating future development in the floodplain so new buildings will be protected from flooding by ordinance relating to electric hookup.
    4. Regulate stream construction such as drains placed in streams outside the mapped floodplain.

Zoning is not a preferred subject to most residents of the county. They don't want to be told what they can do with their property.

b. **Property Protection:** These are activities that are undertaken on a building-by-building basis. Activities reviewed include:

    1. Relocation and acquisition. This is a very likely approach. Pike county and the Army Corps of Engineers are currently doing a joint flood proofing project.
    2. Building elevation and flood proofing. If the homeowner doesn't want to move this can be used as an alternative to acquisition or relocation. The cost of elevating homes on crawl spaces is approximately $15,000-$20,000. There are some less expensive methods of flood proofing that may be appropriate for some the homes. "Increased Cost of Compliance" is funding mechanism through a flood insurance claim that can help people who have flood insurance.
    3. Insurance. In spite of being a repetitive loss area, many residents did not know that their standard homeowner's policy does not cover flood damage. They need to know that flood insurance is available even for those who don't live in the floodplain and even if they've been flooded in the past. The Floodplain Coordinator can try to improve the outreach project to maybe better inform the residents of the county.

c. **Natural Resource Protection:** Activities that preserve or restore natural areas or the natural functions of floodplains were discussed.

1. Natural areas protection: There are no identified wetlands in Pike County. Because of the widespread mining and increased timbering there are no other types of areas of particular natural value, either.
2. Erosion and sedimentation control: Many residents are concerned about erosion of stream banks in their communities and sedimentation buildup in the streams. This has been discussed with the Corps and the Kentucky Department of Natural Resources Floodplain Management Section. In our discussions, dredging the streams in most cases would only cause stream banks to erode more. This has been determined through field observations. As long as the wide spread mining and timbering continue there will be sedimentation buildup and erosion.

d. **Emergency Services:** Measures taken during a flood to minimize its impact were reviewed with the County Emergency Manager, State Emergency Management Agency's Regional Coordinator, and the Corps. There are three main approaches;

1. Warning: Most property owners want some type of flood warning system in place. With more development taking place the population should grow. This puts more citizens in danger of drowning. The Emergency Manager has acquired the DCC Communicator and the computer to monitor the rain and river gauges which was one of Pike County's original goals. This should give the residents ample warning time and reduce the danger of drowning along with property loss and damage. With the DCC Communicator, any specific area that is at risk of being flooded can be contacted and given an early warning without the warning being given countywide.
2. Flood response: The County's Emergency Manager and Floodplain Coordinator have received some class training on flood warning and response with exercises in the class room. However, he has several years of experience at his job and has responded and dealt with several floods. When the new equipment is put in place and the training becomes available the Emergency Manager and Floodplain Coordinator will attained the training.
3. Evacuation: Pike County has an Emergency Operation Plan (EOP). Included in this plan are evacuation procedures.

e. **Structural Projects:** The Corps representative discussed possible projects that could control flooding:

1. Levee: Construction of a levee was presented as a possible structural method of keeping floodwaters away from homes. The Corps has indicated they would rather stay away from structural projects. However, the Corps, the State of Kentucky, and Pike County are jointly doing a flood proofing project now. This project will be extended to include the tributaries of the Tug Fork. These tributaries include (Knox Creek, Peter Creek, Blackberry Creek, Pond Creek and some smaller streams). In this project homes and buildings will either be acquired or elevated. Hopefully the Levisa Fork project can be started which is an extremely large project with two structural projects and over 2,000 structures to be acquired or elevated.
2. Reservoir: As with a levee, the Corps rather not do a structural project, and besides there is no suitable location in the county for a reservoir to be constructed.

f. **Public Information:** Activities that advise property owners about ways to protect people and property from flood damage were discussed.

1. Information materials: Property owners could use more information on the following subjects; flood hazards, flood insurance, "Increased Cost of Compliance", property protection, flood safety, floodplain development permits. The county will be

implementing outreach projects that cover these topics as part of its Community Rating System activities.

2. Site-specific advice: The County Floodplain Coordinator can provide advice and assistance on how to protect buildings from flooding problems.

9.1 ACTION PLAN

Based on the review of the six categories, it is recommended that the county implement the following floodplain management activities.

- **Floodplain Regulations:** The County has adopted an ordinance, which requires any new construction to go through the Floodplain Management Office before the electrical hookup can be made. This ordinance is in effect and seems to be working. This was one of the original goals and has been met. The County needs to work to continue to keep this ordinance in effect.
- **Flood Protection Assistance:** The Floodplain Coordinator should work with Congressman Rogers and his office to have other areas of the county placed in the Pike County Nonstructural Project. Also work with Congressman Rogers to have the Levisa Fork and the tributaries put in a flood proofing project.

The Floodplain Coordinator should work with the Army Corps of Engineers to study and design a means of protecting the area of Meta. This will probably have to be done on a cost share basis. The Fiscal Court will need to appropriate money for this project. The County Floodplain Coordinator's Office should provide technical advice and information on various retrofitting techniques and other flood protection information. This service should be made to all residents of Pike County at no charge. Assistance can include a face-to-face meeting on site to discuss individual flood problems.

Flood Protection Materials: The County Floodplain Coordinator should obtain copies of FEMA's flood protection materials and store them in his office and library. This material is designed for laypeople and will help homeowners learn how to protect themselves.

- **Emergency Training:** The County Floodplain Coordinator and Emergency Manager should attend appropriate training on flood warning and flood response planning.
- **Flood Warning:** The County will continue to keep the flood warning system operational and up to date with any improvements that can be made. Pike County due to the Emergency Manager's efforts is now a Storm Ready County.

10.1 IMPLEMENTATION

This Floodplain Management Plan will be maintained by the Floodplain Coordinator. The coordinator will be responsible for overall implementation of the plan and for presenting an annual update to the Pike County Fiscal Court every December. The update will provide an overview of the plan and the progress made over the previous 12 months towards implementing the action items listed in Section 9.

Failure to achieve any of the action items by the target date will require the County Floodplain Coordinator to report to the Pike County Fiscal Court on why the item was not completed or propose an alternative for achieving it.