

# **Hazard Mitigation Plan Annex for Pike County**

**An Annex of the  
Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan**

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## **Section A.1 - Hazard Mitigation Plan Introduction**

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A.1.1 Plan Scope

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### **A.1.1 Plan Scope**

The Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan is a plan that details the multitude of hazards that affect the Alabama Emergency Management Agency (AEMA) Division B area. This region includes Barbour, Butler, Coffee, Covington, Crenshaw, Dale, Geneva, Henry, Houston, and Pike counties and the municipalities, as well as other jurisdictions, within these counties. The first version of this plan covered Barbour, Butler, Coffee, Covington, Geneva, Henry, and Houston counties. Pike County is inserted in this update. This plan annex fulfills the requirements set forth by the Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 requires counties to formulate a hazard mitigation plan in order to be eligible for mitigation grants made available by the Federal Emergency Management Agency (FEMA).

### **A.1.2 Authority**

Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (public Law 93-228, as amended), Title 44 Code of Federal Regulations, as amended by Part 201 of the Disaster Mitigation Act of 2000 requires that all state and local governments develop a hazard mitigation plan as a condition of receiving federal disaster assistance. These plans should be approved by FEMA and updated every five years.

### **A.1.3 Funding**

Funding for the Hazard Mitigation Plan Annex for Pike County - An Annex of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan was made available through the Pre-Disaster Mitigation Program (PDM). Supplemental funding was supplied by the Pike County Commission and local jurisdictions.

### **A.1.4 Purpose**

The Hazard Mitigation Plan Annex for Pike County – An Annex of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan is an effort to evaluate and identify all prioritized hazards which may affect Pike County. It presents mitigation strategies that address the hazards identified. This plan is only one of many steps jurisdictions in Pike County will take to protect the welfare of residents by achieving a safer environment for its residents.

## **Section A.2 Pike County Profile**

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- A.2.1 Background
- A.2.2 Demographics
- A.2.3 Business and Industry
- A.2.4 Infrastructure
- A.2.5 Land Use and Development Trends

### **A.2.1 Background**

Information pertaining to Pike County is included in Section 2.1 (Background) of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan.

### **A.2.2 Demographics**

Information pertaining to Pike County is included in Section 2.2 (Demographics) of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan.

### **A.2.3 Business and Industry**

Information pertaining to Pike County is included in Section 2.3 (Business and Industry) of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan.

### **A.2.4 Infrastructure**

Information pertaining to Pike County is included in Section 2.4 (Infrastructure) of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan.

### **A.2.5 Land Use and Development Trends**

Information pertaining to Pike County is included in Section 2.5 (Land Use and Development Trends) of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan.

## **Section A.3 – Planning Process**

This Planning Process section of the Plan Annex addresses requirements of Section 201.6(c)(1) through providing the planning process used to develop the Plan Annex, including how it was prepared, who was involved in the process, and how the public was involved.

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- A.3.5 Integration with Existing Plans

### **A.3.1 Multi-Jurisdictional Plan Adoption**

Each participating jurisdiction in Pike County will adopt the Plan Annex when it is deemed “approvable pending adoption” by the Federal Emergency Management Agency (FEMA). Eligible jurisdictions include local governing bodies, including municipal councils, county commission, and local school districts.

### **A.3.2 Multi-Jurisdictional Planning Participation**

Each eligible local jurisdiction in Pike County provided sufficient participation in the development of the Plan Annex. Local jurisdictions participated according to the standards set forth by the Regional Hazard Mitigation Planning Committee in the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan.

### **A.3.3 Hazard Mitigation Planning Process**

The Hazard Mitigation Plan Annex for Pike County – An Annex of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan was developed through interaction between the Pike County EMA Director, local stakeholders, and the Southeast Alabama Regional Planning and Development Commission (SEARP&DC), which comprised the Pike County Hazard Mitigation Planning Committee.

Members of the Pike County Hazard Mitigation Planning Committee reviewed the previous local hazard mitigation plan and the requirements for participating within the regional planning process that was developed by the Regional Hazard Mitigation Planning Committee for the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan. The Committee decided that while actual physical presence at the meetings was preferred, it would not be a requirement.

Each jurisdiction (Table A.3.1) was expected to participate in the planning update process by:

- Attending scheduled meetings, or if unable to attend, send a designee or make themselves available to discuss the plan update process through phone conversation or in-person meeting
- Represent their jurisdiction’s interests, including gathering information and providing feedback, including providing survey comments or marking up information on their existing hazard mitigation plan
- Provide an assessment of prioritized projects that have been completed or are ongoing, or changes to prioritization
- Adopt the Hazard Mitigation Plan

During spring and summer 2016, packets of information containing planning materials were sent to each jurisdiction for review prior to the county-level LEPC meetings that were held in June and August 2016. The scope of the meetings was to assess the progress of each jurisdiction’s mitigation goals and objectives and to find out recent hazard events and how they affected each jurisdiction. From these meetings, hazard profiles were consolidated and updated for the scope of the plan and risk analysis was conducted using historical and local documentation. Plan drafts were distributed to stakeholders and local jurisdictions for review and the plan draft was discussed in a public meeting before submission to AEMA and FEMA.

**Table A.3.1 Pike County Hazard Mitigation Planning Committee**

Jurisdiction	Primary Contact	Attended Meetings	Provided Written Comments	In-Person or Phone Consultation
Pike County	Jeanna Barnes, EMA Director	X	X	X
Town of Banks	Don Smith, Council Member		X	X
City of Brundidge	Linda Faust		X	X
Town of Goshen	Darren Jordan, Council Member	X	X	X
City of Troy	Jacob Fannin, Risk Mgt Coordinator	X	X	X
Pike County Schools	Mike Johnson, Transp. Supervisor / Tom Hicks, Finance Director	X	X	X
Troy City Schools	Christie Armstrong, Asst. Superintendent		X	X
Troy University	Herb Reeves, Dean of Student Services		X	X
Pike County Health Department	Samantha Adkins	X	X	X
Troy Regional Medical Center	Jason Jones, ER Director	X	X	X
Pike County E-911	Chris Dozier, Director	X	X	X

### **A.3.4 Public and Other Stakeholder Involvement**

Opportunity for public comment was provided for in multiple ways. All stakeholder meetings were open to the public, advertised public meetings were held for review of the plan draft and will be held again prior to adoption of the approvable plan, and plan drafts were available for review at municipal offices, as well as being posted on SEARP&DC’s website. The public was informed of the hazard mitigation plan and invited and encouraged to attend planning meetings through various media announcements, including but not limited to: newspaper notices and advertisements, radio advertisements, local EMA website postings, and local postings. There were some public attendance at planning meetings. Documentation of public participation is also included in Appendix B. Future plan updates will work to incorporate additional public involvement, as described in Section A.6.3.

The Southeast Alabama Regional Planning and Development Commission (SEARP&DC) and local EMA directors consulted with multiple stakeholders in formation of the Regional Plan, of which substantial information included Pike County. The U.S. Army Corps of Engineers and PowerSouth Electrical Cooperative provided information concerning dam failure and mitigation that covered much of the region. The Alabama Forestry Commission provided information pertaining to wildfire information. The Geological Survey of Alabama (GSA) was consulted for landslide and land subsidence hazard information. Concepts of the Plan update were discussed with regional partners, including other EMA offices in Division B. State representatives from the Alabama Department of Public Health and the Alabama Department of Transportation were involved in planning meetings. Representatives from local higher education, such as Troy University reviewed hazard mitigation data. Private sector entities, such as Troy Regional

Medical Center, Haynes Ambulance, and other local businesses contributed to the plan formation. Additional stakeholder involvement will be solicited in future plan updates, as described in Section A.6.1.

### **A.3.5 Integration with Existing Plans**

Existing plans, including the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan, were consulted upon drafting of the Hazard Mitigation Plan Annex for Pike County. Plans reviewed include:

#### **Alabama State Hazard Mitigation Plan (2013 Update):**

The State Hazard Mitigation Plan was consulted to assist with consistency of information within the Regional Plan and the Annex for Pike County, including items within the Risk Assessment and local capabilities.

#### **Pike County, Alabama Natural Hazards Mitigation Plan:**

Pike County's previously developed local hazard mitigation plan provided background information and was reviewed for updating mitigation strategies and actions.

**SCAEDD Comprehensive Economic Development Strategy (CEDS) (2014 Update):** The SCAEDD Regional CEDS was consulted to ensure the Hazard Mitigation Plan is consistent with the economic development strategy for the South Central Alabama region that includes Pike County.

#### **Pike County Emergency Operations Plan:**

Pike County has a current Emergency Operations Plan (EOP) that is utilized in an emergency situation. The plan summarize various hazards and provide direction for emergency personnel in disaster situations. This plan complements the hazard mitigation plan, but does not necessarily cover the same material.

**Pike County Threats and Hazards Identification and Risk Assessment (THIRA) (2015 Revision):** The Pike County THIRA identifies prominent threats and impacts from a variety of hazards to the county. Information from the THIRA was used for consistency with the Hazard Mitigation Plan Annex.

Other sources utilized for data incorporation are listed in the Section A.4 – Risk Assessment.

## **Section A.4 – Risk Assessment**

This section of the plan addresses requirements of Section 201.6 (c)(2).

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### A.4.1 Hazard Overview

Pike County is affected by a wide range of natural and human-caused hazards that negatively impact life and property. Current FEMA regulations under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused hazards (i.e., technological hazards, terrorism, etc.) is allowed, but not required for plan approval. The Hazard Mitigation Plan Annex for Pike County – An Annex of the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan concentrates on natural hazards, but does include a summarized assessment of potential human-caused hazards.

### A.4.2 Hazard Profiles

Pike County, as similar to the other counties in AEMA Division B, is affected by multiple hazards that are addressed below. These hazards were identified and evaluated through a process that included studying historical events, concurrence with the Regional Multi-Jurisdictional Hazard Mitigation Plan, the previous local mitigation plan, susceptibility of locations to hazards, and input from local stakeholders. For each hazard addressed in the risk assessment, general descriptions of the hazards and its extent of effects on Pike County are included. Some information from Pike County were previously included in portions of the Risk Assessment within the Southeast Alabama Regional Multi-Jurisdiction Hazard Mitigation Plan.

Due to its geographical location, areas in Pike County, as similar to the other counties in AEMA Division B, are vulnerable to many hazards that potentially disrupt life and property during any time of the year. Hazard types that have no applicability to the county are: avalanche, coastal erosion, tsunami, and volcano. These hazards will not be mentioned any further. Table A.4.1 displays potential hazards and if they present a risk to the planning area, including information sources and how the hazard associates to Pike County.

**Table A.4.1: Potential Hazards and Data Sources**

Hazard	Risk	Source	Correlation with County
Avalanche	No	US Forest Service National Avalanche Center ( <a href="http://www.fsavalanche.org/">http://www.fsavalanche.org/</a> )	No risk of avalanche events in Alabama
Coastal Erosion	No	FEMA Coastal Erosion Hazards Report ( <a href="http://www.fema.gov/media-library/assets/documents/8397">http://www.fema.gov/media-library/assets/documents/8397</a> )	Pike County is an inland area
Dam Failure	Yes	USACE National Inventory of Dams ( <a href="http://geo.usace.army.mil/pgis/f?p=397:12:">http://geo.usace.army.mil/pgis/f?p=397:12:</a> )	Population downstream from dams; flooding concerns; no State regulation of dam safety
Drought / Extreme Heat	Yes	United States Drought Monitor ( <a href="http://droughtmonitor.unl.edu/">http://droughtmonitor.unl.edu/</a> ) / NOAA National Climatic Data Center ( <a href="http://www.ncdc.noaa.gov/stormevents/">http://www.ncdc.noaa.gov/stormevents/</a> )	Historic incidents with damage
Earthquake	Yes	USGS Earthquake Hazards Program ( <a href="http://earthquake.usgs.gov/earthquakes/">http://earthquake.usgs.gov/earthquakes/</a> )	Proximity to Southeast US seismic zones
Flooding	Yes	NOAA National Climatic Data Center ( <a href="http://www.ncdc.noaa.gov/stormevents/">http://www.ncdc.noaa.gov/stormevents/</a> )	Historic incidents with damage / identified flood hazard areas

Hazard	Risk	Source	Correlation with Region
High Winds (Hurricanes, Tornadoes, Windstorms)	Yes	National Weather Service (NWS) Storm Data ( <a href="http://www.srh.noaa.gov/bmx/?n=stormdata_main/">http://www.srh.noaa.gov/bmx/?n=stormdata_main/</a> ) / NWS Tornado Database ( <a href="http://www.srh.noaa.gov/bmx/?n=tornadodb_main/">http://www.srh.noaa.gov/bmx/?n=tornadodb_main/</a> ) / National Hurricane Center Data Archive ( <a href="http://www.nhc.noaa.gov/data/#tcr">http://www.nhc.noaa.gov/data/#tcr</a> )	Historic incidents with damage
Landslides	Yes	USGS Landslides Hazard Program ( <a href="http://landslides.usgs.gov/hazards/nationalmap/">http://landslides.usgs.gov/hazards/nationalmap/</a> ) / Geological Survey of Alabama, Landslides ( <a href="http://gsa.state.al.us/gsa/geologichazards/Landslides.htm">http://gsa.state.al.us/gsa/geologichazards/Landslides.htm</a> )	Susceptible areas to landslides
Land Subsidence / Sinkholes	Yes	Geological Survey of Alabama, Sinkholes in Alabama ( <a href="http://gsa.state.al.us/gsa/geologichazards/Sinkholes_AL.htm">http://gsa.state.al.us/gsa/geologichazards/Sinkholes_AL.htm</a> )	Susceptible areas to land subsidence / sinkholes
Tsunami	No	NOAA, Tsunami ( <a href="http://www.tsunami.noaa.gov/">http://www.tsunami.noaa.gov/</a> )	Pike County is an inland area
Volcano	No	USGS, Volcanoes ( <a href="http://volcanoes.usgs.gov/index.html">http://volcanoes.usgs.gov/index.html</a> )	Not near an active volcano
Wildfire	Yes	Southern Group of State Foresters Wildfire Risk Assessment Portal ( <a href="https://www.southernwildfirerisk.com/map/index/public">https://www.southernwildfirerisk.com/map/index/public</a> )	Identified susceptible areas
Winter / Ice Storms	Yes	NOAA National Climatic Data Center ( <a href="http://www.ncdc.noaa.gov/stormevents/">http://www.ncdc.noaa.gov/stormevents/</a> )	Historic incidents with damage

Effects from high winds (primarily from tornadoes and hurricanes) and flooding are regarded as the most significant natural hazards affecting the planning area.

Many hazards are multi-faceted and interrelated; therefore, some are grouped together due to their impacts and mitigation strategies being similar. An example is a high wind event, resulting from a hurricane, tornado, or severe thunderstorm, may produce direct damage to critical facilities and other structures and may render roadways impassible due to debris.

AEMA Division B has been included in 25 Federal Disaster Declarations, with Pike County being included in 11 Federal Disaster Declarations as shown in Table A.4.2. The declared disasters have been primarily related to two major types of impact: flooding (through both tropical and non-tropical events) and high winds (through hurricanes, tornadoes, and severe thunderstorms). There has also been a declaration for a drought incident and a winter storm that affected the entire Southeast Alabama region.

**Table A.4.2: AEMA Division B Federally-Declared Disasters**

Declaration Date	Disaster Number	Type of Incident
March 14, 1975	458	Severe Storms/Flooding
October 2, 1975	488	Severe Storms/Tornadoes/Flooding
July 20, 1977	3045	Drought
March 21, 1990	861	Severe Storms/Tornado
March 15, 1993	3096	Severe Snowfall and Winter Storm

<b>Declaration Date</b>	<b>Disaster Number</b>	<b>Type of Incident</b>
October 4, 1995	1070	Hurricane Opal
September 15, 2004	1549	Hurricane Ivan
July 10, 2005	1593	Hurricane Dennis
December 31, 2009	1870	Severe Storms/Flooding
April 28, 2011	1971	Severe Storms / Tornadoes / Straight-line Winds / Flooding
January 21, 2016	4251	Severe Storms / Tornadoes / Straight-line Winds / Flooding

*Source: Federal Emergency Management Agency (July 2016)*

Under a federally-declared disaster, the State of Alabama and affected local jurisdictions are eligible to apply for federal reimbursement for debris removal, emergency services, and critical facility repair/replacement. Funding is also made available for hazard mitigation grants that allow for implementation of mitigation projects that are listed in this plan.

Each hazard profile includes a summary of the following:

- **Background:** Provides general definitions and brief descriptions of the hazard, its characteristics, and potential effects.
- **Locations Affected:** Provides information on the geographic areas within the planning area that are susceptible to hazard occurrences. Locations affected are described regionally, unless a specific jurisdiction has different risks, which is further explained in comparison with the rest of the planning area.
- **Extent:** Provides information on the potential strength or magnitude of the hazard.
- **Historical Occurrences:** Provides information on the history of previous hazard events in the planning area, including their impacts.
- **Probability of Future Events:** Describes the likelihood of future hazard occurrences in the planning area. Many hazards may affect the entire planning area, while other hazards are more localized due to specific factors. These qualitative descriptions are from historical occurrences and other risk factors. Because of the lack of comprehensive quantitative data on many of the hazards, susceptibility to future damage will be noted by categories of High, Medium, Low, or Very Low described below.
  - **High:** Probable major damage in a 1-10 Year Period
  - **Medium:** Probable major damage in a 10-50 Year Period
  - **Low:** Probable major damage in a 100 Year Period
  - **Very Low:** No probable major damage in a 100 Year Period

## DAM / LEVEE FAILURE

### Background

Dam and levee malfunctions may cause failures that flood areas downstream through releasing large volumes of water with little warning, which may cause extensive property damage and casualties. Dam safety has been an ongoing hazard mitigation issue in the State of Alabama for the past two decades as infrastructure has been aging, especially regarding small dams that are privately owned and poorly maintained. No state law exists to regulate any existing private dams or the construction of new private dams that do not require federal licenses or inspections. There have been multiple attempts to pass legislation, which would require inspection of dams on bodies of water over 50 acre-feet or dams higher than 25 feet. Approximately 1,700 privately owned dams in the State of Alabama would fit into the category proposed by the law.

### Locations Affected

There are 21 recorded dams in Pike County listed in the National Inventory of Dams (NID), which is maintained by the U.S. Army Corps of Engineers (USACE). Of these, zero (0) are classified by the USACE as high-hazard dams. However, the NID is an outdated source, due to Alabama's lack of regulatory authority, and the true number of high hazard dams is potentially much higher. Localized studies of the NID data conducted by the Alabama Office of Water Resources (OWR) outside of the planning region has shown that many NID points are not spatially accurate and does not represent the potential hazards with the particular dams. There are also private dams in many areas that are not necessarily known by local authorities. The OWR is in the process of developing a dam inventory, which will include classifying hazard potential. However, this inventory has not been completed at this time. Future updates to the Regional Hazard Mitigation Plan will incorporate information from the OWR study, when available, which will be much more accurate than what is currently available.

Table A.4.3 provides the dams listed in the National Inventory of Dams (NID) for Pike County. The dams are mostly scattered throughout the County

**Table A.4.3: NID Listed Dams in Pike County**

Dam Name	County	Owner Type	NID Height (ft)	NID Storage (acre ft)
Foy Ingram Pond	Pike	Private	15	62
Youngblood	Pike	Private	15	182
Copeland	Pike	Private	15	109
Sorrell Lake Dam	Pike	Private	13	164
Henderson Lake	Pike	Private	22	728
Pike Pond	Pike	Private	24	96
Milton Carter	Pike	Private	20	110
Pike County Lake	Pike	Local Govt	25	300
Crowes	Pike	Private	10	88
Morgans Pond	Pike	Private	15	218
Bill Chapman Pond	Pike	Private	18	132
Sanders Pond Dam	Pike	Private	17	56

Dam Name	County	Owner Type	NID Height (ft)	NID Storage (acre ft)
JM Curtis Pond	Pike	Private	16	73
Harold Freeman Pond	Pike	Private	20	124
Bill Chapman Pond	Pike	Private	23	103
WR Chapman Lake Dam #2	Pike	Private	29	19
Harris Pond	Pike	Private	22	192
Robert Dunn	Pike	Private	26	437
Brooks Farm Pond Dam	Pike	Private	22	66
Harris Lake Dam	Pike	Private	35	249
WR Chapman Lake Dam #1	Pike	Private	17	68

Source: *The National Inventory of Dams (July 2016)*

## Extent

The potential extent of dam failure may be classified by their “hazard potential”. The “hazard potential” for dams indicates the probable damage that would occur if the dam failed, in regards to human life and property damage. The Federal Guidelines for Dam Safety presents three classifications for Dam Hazard Potential (Table A.4.4). Once OWR finishes its study and provides a state classification of dams, a more detailed discussion of potential extent will be presented in future updates.

**Table A.4.4: Dam Hazard Classifications**

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low; generally limited to owner
Significant	None expected	Yes
High	Probable; one or more expected	Yes

Source: *Federal Guidelines for Dam Safety (Published April 2004)*

In most areas of Pike County, the extent of damage caused by dam failure would include a flooding depth of up to several feet that would damage agricultural areas, isolated structures, and some public infrastructure, including adjacent streets.

## Historical Occurrences

Dam failures are extremely rare events, and have not been recorded within Pike County. There is one account of flooding overtopping a private dam near Troy, with no accounted damage. However, dam failures have occurred in other areas of AEMA Division B (Crenshaw and Dale counties) after heavy rainfall events. The Lake Tholocco Dam at Fort Rucker (Dale County) has failed twice in the last 30 years (1990 and 1994), the C.D. Clark Dam in Dozier (Crenshaw County) failed in 1990, and the Magnolia Shores Lake Dam (Crenshaw County) failed in 1990, all after extensive rain events that were federally-declared disasters. These dam failures did not cause any casualties, but the C.D. Clark Dam failure caused damage to U.S. Highway 29 and

Lake Tholocco was not utilized again for over six years, impacting recreational opportunities in the area.

### **Probability of Future Events**

The few previous occurrences of dam failures known regionally have transpired due to historically extensive rainfall over a large area. There is no documented occurrence of dam failure within Pike County (one reported instance of minor overtopping) and only rarely in neighboring counties associated with a large rainfall event and major flooding situation. Because of dated and incomplete information pertaining to dam classification in Alabama, it is difficult to ascertain which dams are more susceptible to failure than others until the Alabama Office of Water Resources (OWR) completes their dam inventory. Therefore, dam failure is an unlikely occurrence in the jurisdictions in Pike County and will be considered to have a Low likelihood of probability.

# DROUGHT / EXTREME HEAT

## Background

Drought occurs when there is below-average precipitation over an extended period of time, gradually affecting hydrological, agricultural, and social concerns. Occurrences of drought are typically classified as follows (Table A.4.5).

**Table A.4.5: Drought Classifications**

<b>Meteorological Drought</b>	Departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
<b>Hydrologic Drought</b>	Effects of precipitation shortfalls on streamflows and reservoir, lake, and groundwater levels.
<b>Agricultural Drought</b>	Soil moisture deficiencies relative to water demands of plant life, usually crops.
<b>Socioeconomic Drought</b>	Effects of demands for water exceeding the supply as a result of a weather-related supply shortfall.

*Source: FEMA's Multi-Hazard Identification and Risk Assessment (MHIRA) (Published January 1997)*

Extreme heat is abnormally high temperatures that disproportionately affect the elderly, very young, and those with health concerns if exposed to the conditions, especially those without effective climate control systems. Temperatures of 90 degrees or more are regularly observed in the summer months, with 100 degree temperatures being possible. In Pike County, extreme heat tends to occur in conjunction with drought conditions.

Since the area has agricultural uses that are adversely affected by drought conditions, drought is also a potentially serious economic threat to the area. Drought can also be a contributing factor to wildfires in the forested areas. Similarly, since high temperatures and humidity are possible and occur frequently during the summer months, heat wave conditions are possible in the area. Primarily, Pike County's public water supply is drawn from groundwater sources, so extended periods of exceptional drought could potentially limit water supply.

## Locations Affected

Pike County is susceptible to drought and extreme heat due to its location, which is prone to unpredictable precipitation patterns including extended periods of below-average rainfall.

## Extent

For extent of drought, the United States Drought Monitor classifies drought in five levels of severity, based on multiple indicators including soil moisture, streamflow levels, precipitation levels, and local observations (Table A.4.6). These classifications are:

**Table A.4.6: United States Drought Monitor Classification**

<b>Category</b>	<b>Description</b>	<b>Possible Impacts</b>
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed.
D3	Extreme Drought	Major crop / pasture losses; widespread water shortages or restrictions.
D4	Exceptional Drought	Exceptional and widespread crop / pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies.

*Source: United States Drought Monitor (2016)*

Pike County has had multiple instances of D4 levels of exceptional drought, which has caused varying levels of agricultural losses and localized water shortages. The extent of extreme heat for the region is defined as repeated instances of high temperatures over 100 degrees Fahrenheit and associated heat index values of well over 100 degrees Fahrenheit, which may cause human distress. Severe droughts and heat waves may also increase incidence of wildfires.

### **Historical Occurrences**

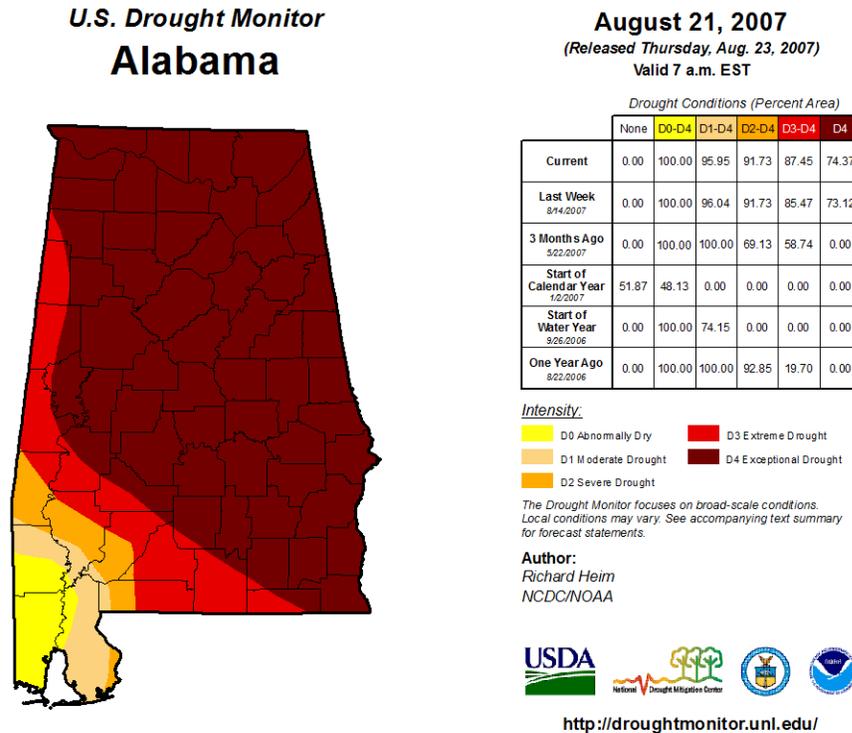
There have been multiple incidences of drought and extreme heat occurrences in Pike County. Quantification of drought occurrences are not easily classified, due to those conditions providing differing effects based on reliance on agricultural, hydrological, or socioeconomic concerns. Therefore, instances of occurrence are taken from the U.S. Drought Monitor and examined from the past decade.

According to the U.S. Drought Monitor, in 2006, Pike County experienced drought conditions from late spring through early autumn that were up to extreme (D3) conditions in July and August. From May 2007 through January 2008, drought conditions returned to the area, with extreme (D3) conditions in June 2007, and exceptional (D4) conditions from August through October 2007, before slowly subsiding. This enduring drought greatly affected agricultural production and hydrological levels were way below normal.

Persistent dry weather caused another enduring drought, with severe (D2) drought conditions to return to Pike County regularly from September 2010 through August 2012, and again from November 2012 through February 2013. In May 2011 D3 conditions persisted in a large area within the county for approximately two months until July 2011, and again from October 2011 through July 2012, with exceptional (D4) drought conditions in eastern sections of the county in isolated periods during this time.

Figure A.4.2 below of the U.S. Drought Monitor Map from August 2007 displays the widespread nature of that particular exceptional drought.

**Figure A.4.2: U.S. Drought Monitor Map, Alabama (Example from August 21, 2007)**



Source: The National Drought Mitigation Center (Accessed 2014)

### Probability of Future Events

The probability of drought and extreme heat occurring within Pike County is relatively high. However, Pike County and its local jurisdictions are capable of managing mild cases of drought and occasional heat waves, rendering minor impacts a majority of the time. Therefore, the likelihood of probability for impactful drought and extreme heat events for the jurisdictions in Pike County is Medium, probable major damage in a 10-50 Year Period.

# **EARTHQUAKE**

## **Background**

An earthquake is a sudden movement of the earth, caused by a release of energy from the crust. Most earthquakes occur along faults, which are cracks in the earth's crust. Little or no warning precedes earthquakes and they can cause property damage on the surface and subsurface by destroying buildings, utility lines, communications, and other infrastructure.

According to the Alabama State Hazard Mitigation Plan, four seismic zones affect the state. These are the New Madrid Seismic Zone (NMSZ), the Southern Appalachian Seismic Zone (SASZ) (also known as the Eastern Tennessee Seismic Zone), the South Carolina Seismic Zone (SCSZ), and the Bahamas Seismic Zone (BSZ), which all mostly affect areas of Alabama away from Pike County and Southeast Alabama. Pike County is not especially at risk from an earthquake, though minor effects from the four aforementioned seismic zones are not out of the question.

## **Locations Affected**

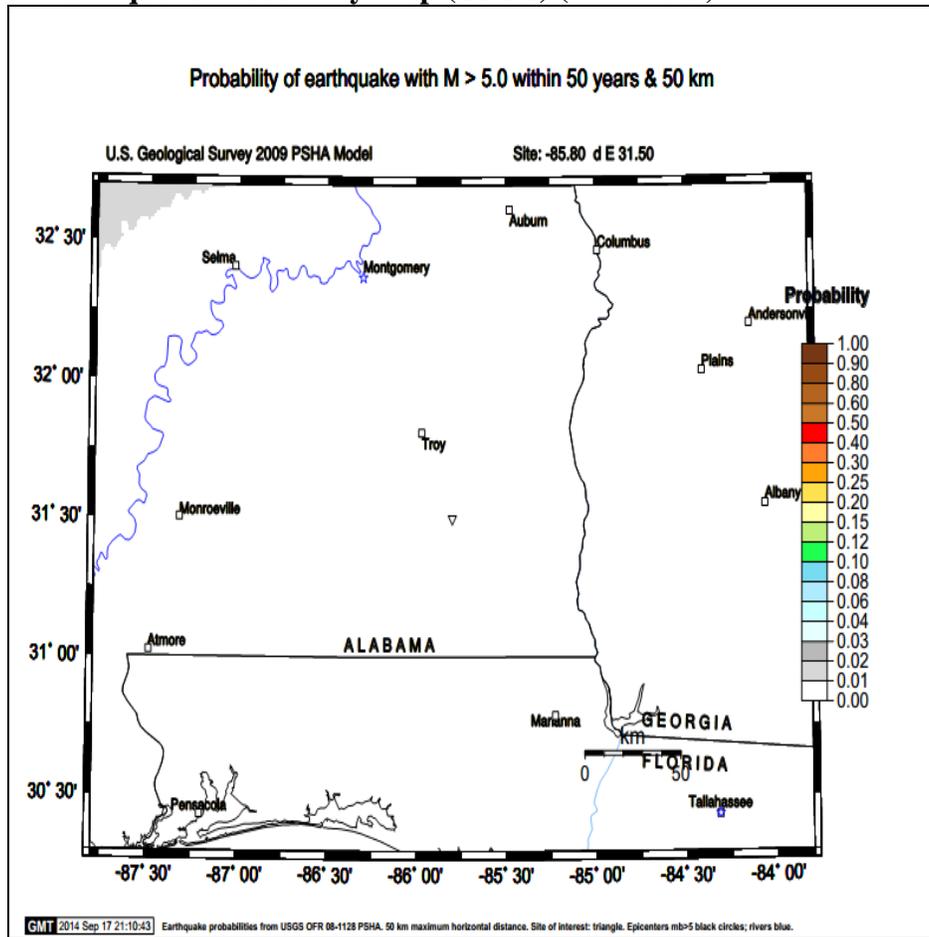
According to the United States Geological Survey (USGS), the maximum peak acceleration for Pike County is a very low seismic risk and there are no recorded earthquake epicenters that have been recorded within the county. There is a possibility of minor effects occurring in the County if a major earthquake occurs elsewhere in the southeastern United States.

## **Extent**

Earthquakes are commonly measured in two ways. The Richter Magnitude Scale measures the earthquake's magnitude, or size, and the Modified Mercalli Intensity Scale measures the earthquake's intensity or the damage caused. The Richter Scale has magnitude measurements from 1 to 9, with a measure of 1 being recorded but not felt, and a measure of 9 being a great earthquake that causes damage over a large area. The Modified Mercalli Intensity Scale has measurements from I to XII, with I being hardly felt, if at all, and XII being total destruction of the surface.

The United States Geological Survey (USGS) publishes seismic hazard maps that estimate earthquake probabilities within a radius of 50 kilometers (km) for a certain time span. The below Figure A.4.3 indicates the probability for a 5.0 magnitude earthquake in a 50 year time span is practically nonexistent.

**Figure A.4.3: Earthquake Probability Map (USGS) (2009 Data)**



Source: United States Geological Survey, Earthquake Hazards Program (2016)

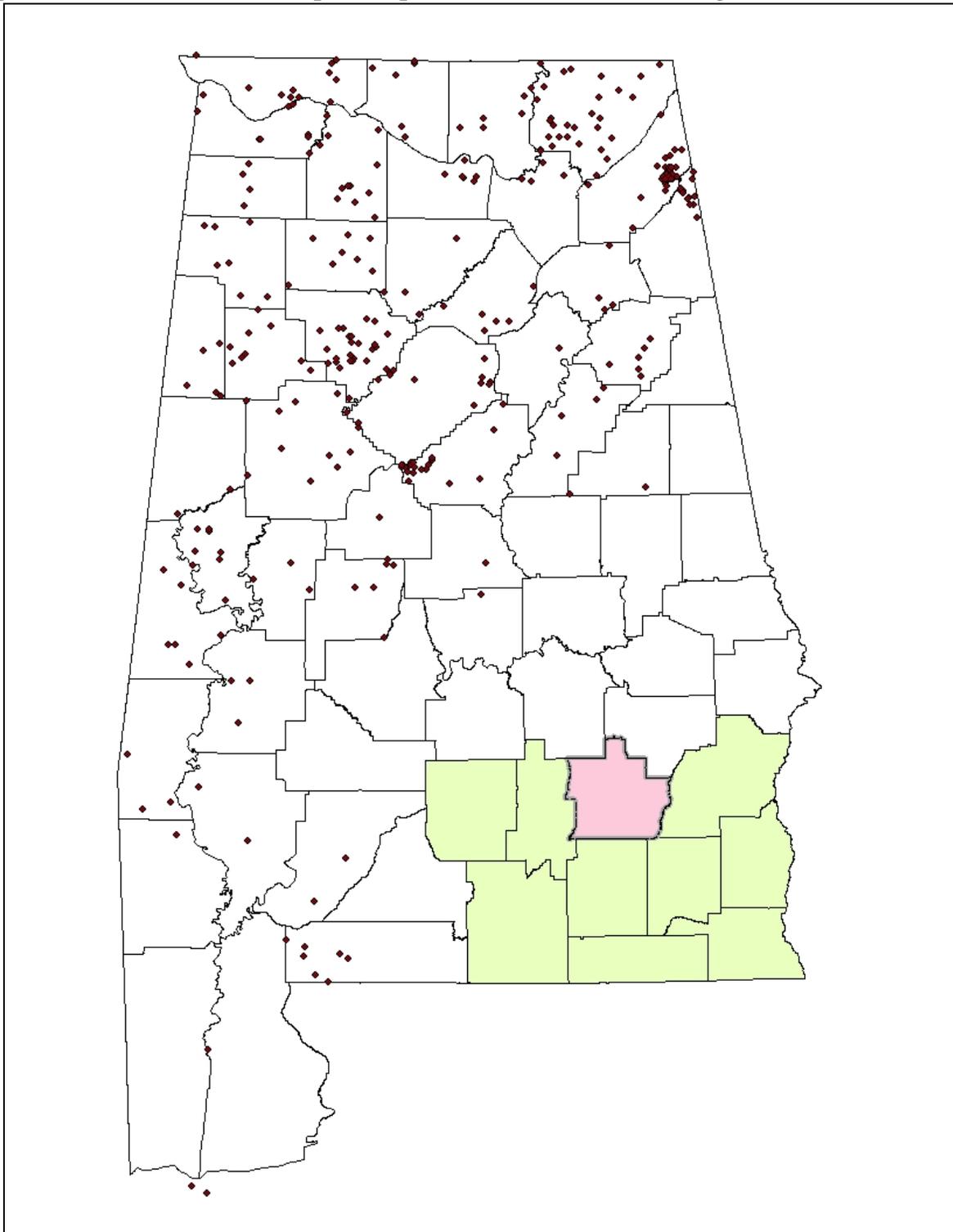
### **Historical Occurrences**

There have been no recorded earthquake events with an epicenter in Pike County (Figure A.4.4). The nearest recorded earthquake with any effect on the Southeast Alabama region occurred on October 24, 1997 in Escambia County. The epicenter recorded a magnitude of 4.9. In the Southeast Alabama region, only Covington County received only minor effects with no recorded damages, and there were no effects in Pike County.

### **Probability of Future Events**

Most earthquakes in Alabama have been low magnitude events with, at most, minor damage, and there have been no recorded earthquakes centered within the planning area. Therefore, the probability of an impactful earthquake on the jurisdictions in Pike County is Very Low and will not be profiled further.

**Figure A.4.4: Historical Earthquake Epicenters in Alabama (through December 2014)**



*Source: Geological Survey of Alabama, Geospatial Data for Alabama; SEARP&DC (2016)*

# FLOODING

## Background

Flooding is considered the most frequent and costly natural hazard in the United States and within AEMA Division B. Flooding normally occurs due to excessive precipitation and is dependent on many factors, including drainage basin characteristics, antecedent soil moisture conditions, weather patterns, and land cover. There are two primary types of flooding that affect Southeast Alabama and Pike County: riverine flooding and flash flooding.

Riverine flooding occurs when substantial levels of precipitation ensue over a long period of time, causing rivers and streams to flow outside of their natural channels and negatively affecting surrounding areas. Many riverine flooding events in Pike County have been associated with hurricanes and other tropical events. Flash flooding is normally instigated by intense amounts of precipitation over a short time period in a localized area. In Pike County, flash floods are more prevalent in urbanized areas, such as Troy, with plentiful impervious surfaces and other areas with obstructions to water runoff. Historically, more flooding events occur between November and April with a peak from February through April. However, flooding can and does occur at any time of year.

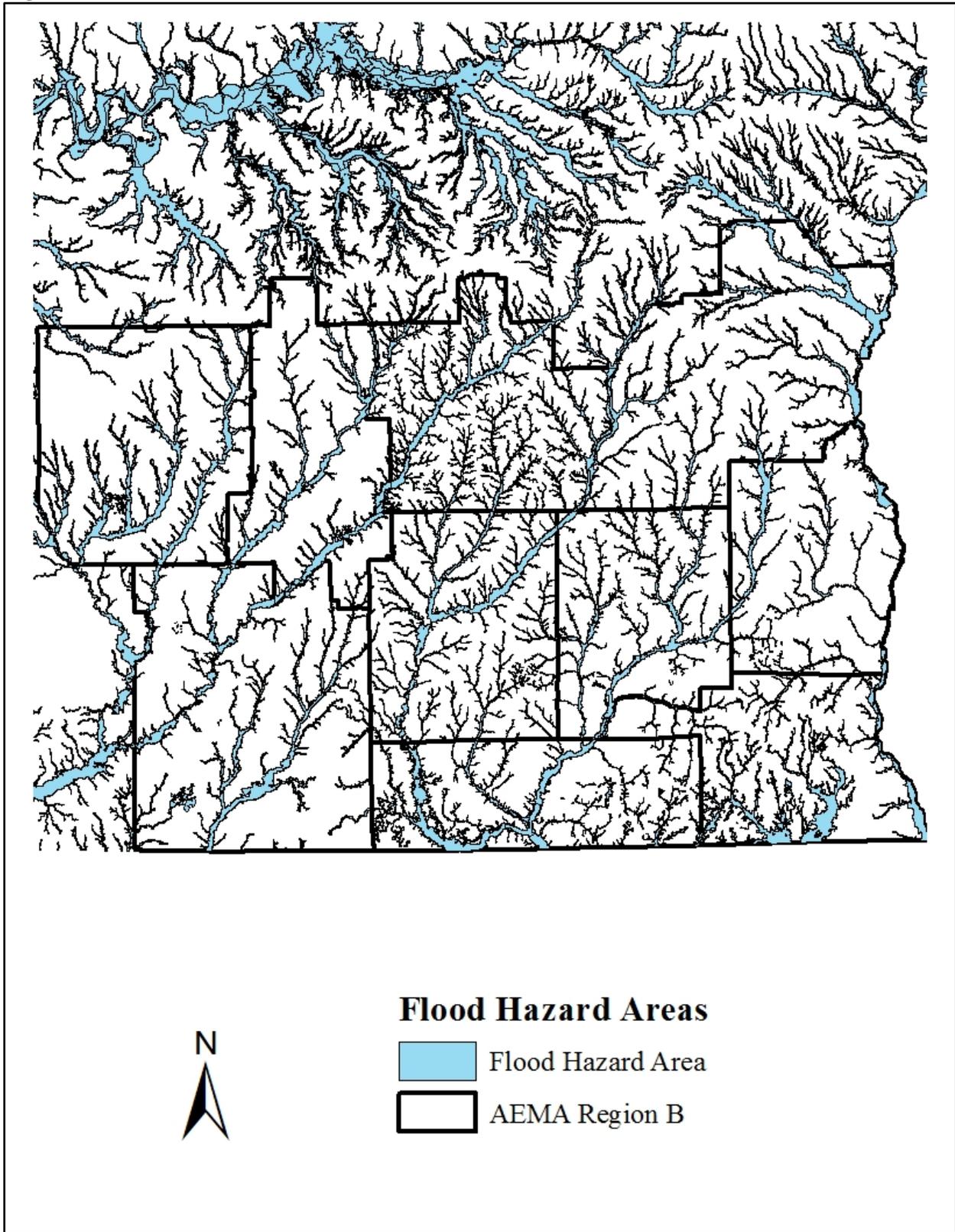
## Locations Affected

Every jurisdiction in Pike County has mapped Special Flood Hazard Areas that show areas of susceptibility to riverine flooding events, and nearly every area can be affected by flash flooding if enough rainfall occurs. Figures A.4.5 and A.4.6 show the location of currently mapped special flood hazard areas for the Southeast Alabama region and Pike County, based on the most recent FEMA National Flood Hazard Layer available. This map includes areas designated Zone A (one-percent annual chance flood). It is important to consider that the FEMA data is not perfectly complete and accurate and some flooding may occur outside of these mapped areas.

The primary riverine flood areas occur along the Patsaliga River in extreme western Pike County, the Conecuh River that flows from northern Pike County to the southwestern corner and flows near the municipalities of Goshen and Troy, and the Pea River which comprises Pike County's eastern border with Barbour County. Tributaries of these rivers, including Whitewater Creek and Mannings Creek, provide additional areas of riverine flood hazards.

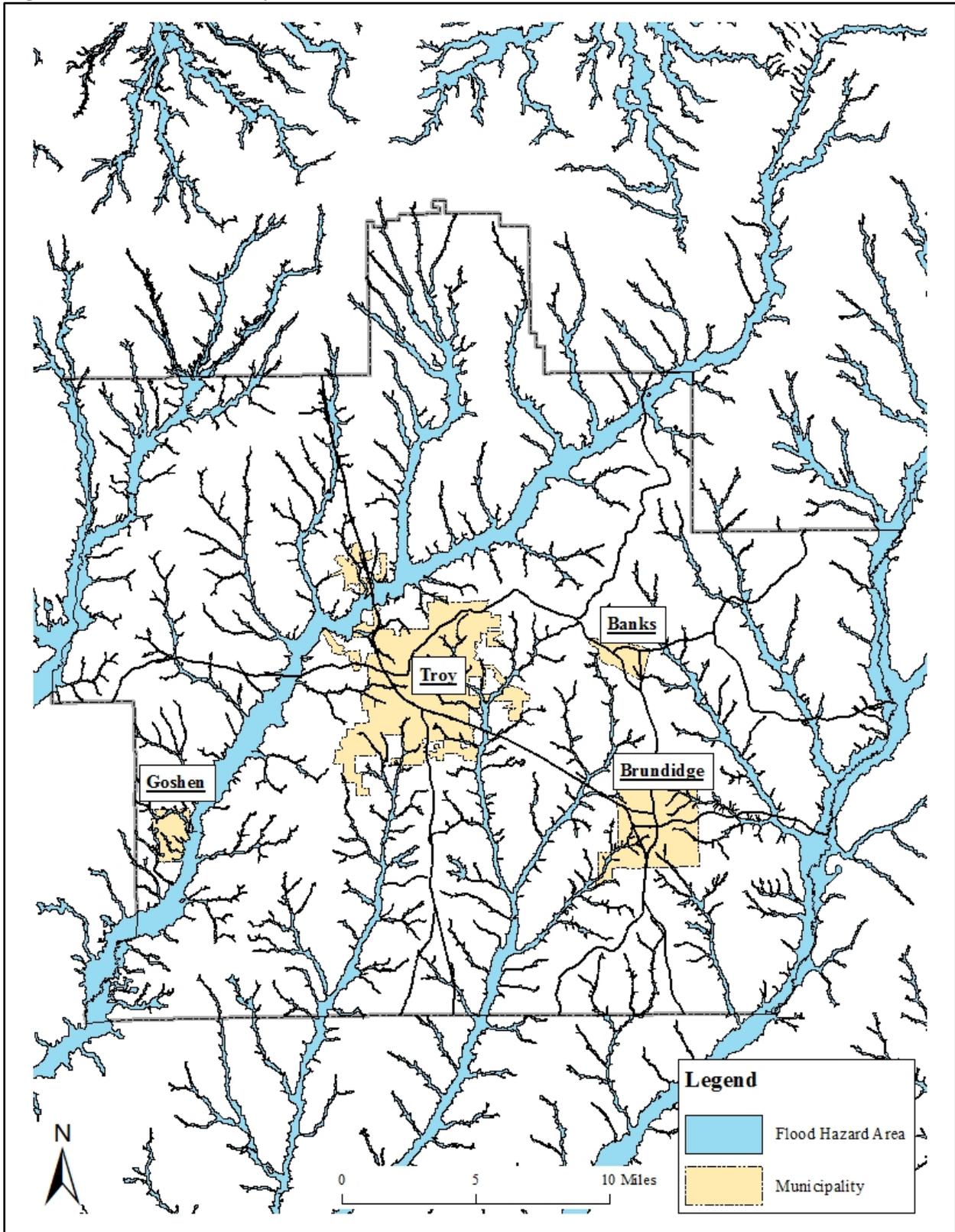
For the most part, the areas in Pike County that are most susceptible to riverine flooding are mostly undeveloped, the historical riverine flooding events have primarily caused isolated damage to agricultural interests along the Conecuh River and Indian Creek and can cross some roads causing accessibility problems, but buildings and major infrastructure has mostly escaped damage during these events. The municipalities of Banks, Brundidge, Goshen, and Troy have mapped flood areas in their jurisdictions, but those are primarily on the periphery of these communities.

**Figure A.4.5: AEMA Division B Flood Hazard Areas**



*Source: Federal Emergency Management Agency; SEARP&DC (2014)*

**Figure A.4.6: Pike County Flood Hazard Areas**



Source: Federal Emergency Management Agency; SEARP&DC (2016)

## **Extent**

The severity of a riverine flood event is typically dependent on several factors, including drainage basin topography, recent precipitation and weather occurrences, and land surface. Periodic riverine flooding on adjacent lands is a natural occurrence. The most common method used to express flood frequency is a percent chance of occurrence in a given year, or annual probability within a FEMA identified floodplain. A 100-year flood event has a one percent (1%) chance of occurring in any year within that floodplain. However, these type floods can occur multiple times during a 100-year period, as described in the Historical Occurrences below. Within the floodplain, a flood event can be expected to inundate the area with several feet of water, which varies across the region, but can be upwards of almost two feet above flood stage as noted by the highest recorded floods described at multiple points in the region. The Pea River at Elba, in neighboring Coffee County, has recorded two flood crests above 43 feet (in 1929 and 1990), which is 13 feet above flood stage. The Choctawhatchee River at Newton, in neighboring Dale County, has recorded a flood crest of 42 feet in 1929, which is 23 feet above flood stage. According to the National Climatic Data Center (NCDC) Storm Events Data, Pike County's extent of flooding during this plan's study period is approximately six inches (6") of water from flash flooding flowing across impacted roadways in Troy, Brundidge, and other areas of Pike County, which occurred in multiple events in 1998, 2009, and 2013. Due to Pike County's location as being primarily near the source of the major rivers in the area, there is a limited record of riverine flooding and the specific extent of riverine flooding. The FEMA Flood Insurance Study (FIS) for Pike County, revised in December 2011, states there are no records of flooding problems found in readily available sources, though heavy discharge indicated on the Conecuh River in 1990 and Indian Creek in 1975 could have resulted in significant flooding, but no quantity amount was given.

The extent of a flash flooding event varies greatly depending on the local geography and rainfall intensity and duration. Normally the extent of flash flooding is not as widespread as a riverine flooding event, but is more variable due to the lack of advance warning before the occurrence of flooded streets and property damage that may occur during these events. There has been more recorded events of flash flooding in Pike County and its jurisdictions than riverine flooding, so flash flooding is regarded as the higher threat due to effects interacting with more developed and populated areas.

## **Historical Occurrences**

Information from the National Climatic Data Center reports a total of 11 flood events since 1990 within Pike County. Major events have primarily occurred from both non-hurricane related flash flooding though tropical systems have also caused flash flooding in portions of Pike County. The most impactful event during this period occurred in March 1998. Pike County was affected by a low pressure system from the Gulf of Mexico that poured several inches of rain in southern Pike County. Numerous roads were washed out and closed due to this flooding. Historically, most flooding events create street damage and cause accessibility issues through the impacts on the local transportation system.

## **Probability of Future Events**

Flooding events will remain a constant threat for Pike County and its jurisdictions. The probability for future riverine flood events based on magnitude and using best available data is

illustrated in the Flood Hazard Area maps above, which indicates the regional and jurisdictional areas susceptible to the one-percent annual chance flood (100-year floodplain). Fortunately, most areas susceptible to riverine flooding are sparsely developed and riverine flooding has only caused minor property damage and no casualties.

The probability for future flash flood events will likely occur more frequently, especially in developed areas such as Troy and Brundidge. In recent years widespread precipitation events have caused flash flooding impacting roads and bridges throughout Pike County. Therefore, the probability of future flood events is considered High throughout the entire planning area.

## **HIGH WINDS (HURRICANES, TORNADOES, AND SEVERE THUNDERSTORMS)**

### **Background**

Pike County is highly susceptible to high wind events from hurricanes, tornadoes, and severe thunderstorms. High wind events may occur any time of year, but occur more often in spring, summer, and fall seasons. A more detailed description of each major contributing storm type follows.

## **HURRICANES**

### **Background**

Hurricanes are cyclones that develop as closed circulation of winds around a low-pressure center. Hurricanes normally have a large diameter and affect a large area. When sustained winds reach the threshold of 39 miles per hour, the tropical system is designated as a tropical storm. The tropical system is designated as a hurricane once it reaches sustained winds of 74 miles per hour. Hurricanes provide a wide spectrum of issues and effects. The intensity and path of a hurricane varies, making the impact of the storm relatively difficult to predict. Though flooding from hurricanes and other tropical systems have historically provided the most widespread regional effects, high winds that occur from these systems have also contributed to regional damage impacts. Tornadoes that are associated with hurricanes may impact the region and are usually weak EF0 to EF1 on the Fujita scale. Sustained winds from hurricanes may cause structural damage to residences, businesses, and infrastructure, including widespread damage to power lines due to trees falling. The primary hurricane season runs from June 1<sup>st</sup> through November 30<sup>th</sup>.

### **Locations Affected**

The entire area within Pike County is susceptible to the occurrence of sustained high winds from hurricanes and other tropical events. Southern areas of the County are slightly more susceptible to high winds, but not at a substantial difference from northern locations in the County.

### **Extent**

Hurricane intensity is classified using the Saffir-Simpson Hurricane Wind Scale, which categorizes hurricane events primarily using maximum sustained winds, but also examining barometric pressure readings and potential storm surge. This gives an estimate of the potential damage that will occur from a hurricane. The Saffir-Simpson Scale is shown in Table A.4.7.

**Table A.4.7: SAFFIR-SIMPSON HURRICANE WIND SCALE**

<b>Category</b>	<b>Sustained Wind Speed (MPH)</b>	<b>Types of Damage Due to Hurricane Winds</b>
1	74-95	<b>Very dangerous winds will produce some damage:</b> Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	<b>Extremely dangerous winds will cause extensive damage:</b> Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129	<b>Devastating damage will occur:</b> Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156	<b>Catastrophic damage will occur:</b> Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 or higher	<b>Catastrophic damage will occur:</b> A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

*Source: National Weather Service National Hurricane Center (2014)*

Hurricanes as intense as Category 5 have made landfall along the Gulf Coast region. Historically, hurricanes have weakened to Category 2 status or lower before tracking through Pike County. However, there is a possibility that a future hurricane event could retain Category 3 winds through the county, as Hurricane Camille in 1969 retained major hurricane status almost 100 miles inland through Mississippi.

### **Historical Occurrences**

Since 1995, Pike County has been impacted by eight (8) tropical cyclones that tracked through or near the county. A summary of impacts to Pike County include:

1. Hurricane Opal (October 1995): Hurricane Opal made landfall near Pensacola Beach, FL as a Category 3 hurricane on October 4, 1995. Opal retained its hurricane status through much of Southeast Alabama and passed west of Pike County, with winds over 100 miles per hour, and caused over \$100 million of damage within the region. Pike County was included in the Disaster Declaration.
2. Hurricane Georges (September 1998): Hurricane Georges made landfall near Biloxi, MS, then made a slow eastward path through the Southeast United States. The primary impact from Georges in Pike County was flooding due to copious amounts of rain causing road closures and several tornadoes.

3. Tropical Storm Barry (August 2001): Tropical Storm Barry made landfall near Santa Rosa Beach, FL and moved northwest through South Alabama west of Pike County, bringing minor wind and flood damage to the area.
4. Hurricane Frances (September 2004): The remnants of Hurricane Frances moved east of Pike County after making landfall in the Florida Big Bend on September 6, bringing 30 to 40 mile per hour (MPH) winds and some minor flooding.
5. Hurricane Ivan (September 2004): Hurricane Ivan made landfall near Gulf Shores, AL on September 16, 2004, then moved north-northeast through Alabama. Pike County received damage from high winds and flooding rains, including approximately 400 homes being damaged. Overall, Alabama had at least \$2.5 billion in damage from Ivan. Pike County was included in the Disaster Declaration.
6. Hurricane Dennis (July 2005): Hurricane Dennis made landfall at Santa Rosa Island, FL on July 10, 2005 and moved north-northwest through Alabama. Pike County received minor wind damage.
7. Hurricane Katrina (August 2005): Hurricane Katrina made landfall in Louisiana on August 29, 2005 and moved north into Mississippi. Katrina caused areas of tree damage within the county. One of the major effects of Katrina was the influx of evacuees from areas further west.
8. Tropical Storm Fay (August 2008): Tropical Storm Fay made landfall near Apalachicola, FL on August 23, 2008 and moved west-northwest across the Florida Panhandle and South Alabama. Fay caused some small tornadoes, heavy rain, and flash flooding in the county.

### **Probability of Future Events**

Hurricanes and other tropical events with high winds are an annual threat for jurisdictions in Pike County, due to being near the Gulf Coast. In the past 150 years, a tropical cyclone has passed through Southeast Alabama approximately once every six years, which does not include tropical cyclones just outside the region that provide impacts (e.g. Hurricane Ivan). Therefore, the probability of future hurricane events affecting jurisdictions in Pike County is High.

## **TORNADOES**

### **Background**

A tornado is a rapidly rotating funnel of air that extends to the ground from clouds. Tornadoes are one of the least predictable weather events, as they can develop very rapidly with little advance warning. Tornadoes do not cover a large spatial area, but may create moderate to extensive damage to structures and be deadly in the areas impacted. Debris may block streets and access to the damaged area may be an issue. Flat tires on emergency vehicles will be common due to this debris. The loss of power and communications to the affected areas will also be common.

### **Locations Affected**

The entire area within Pike County is susceptible to tornadoes. Tornadoes can be assumed to potentially affect any location in the county, due to occurrences being randomly located and the impossibility of predicting specific areas of tornado strikes. Areas within Pike County may have tornado occurrences throughout the year, though there are two discernable seasons, spring and fall.

### **Extent**

Tornado intensity is classified using the Enhanced Fujita (EF) Scale, which is an update to the original Fujita Scale, implemented in February 2007 (Table A.4.8). The EF Scale is still primarily a wind estimate indicator that is based on three-second gust derived by the levels of damage that occur during a tornado event.

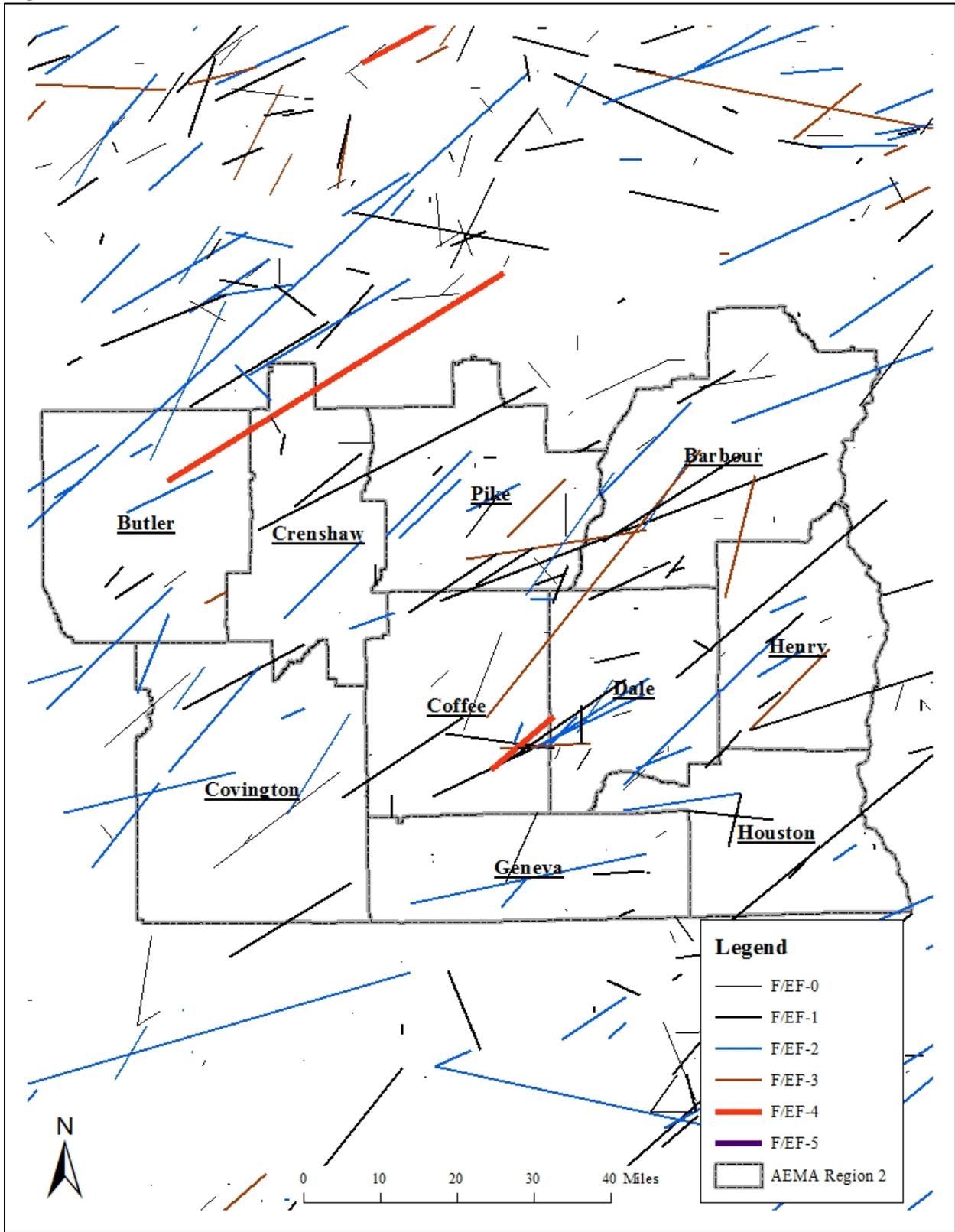
Table A.4.8: ENHANCED FUJITA SCALE				
F Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	Damage Description
0	45-78	0	65-85	LIGHT DAMAGE: Some damage to chimneys; tree branches broken off; shallow-rooted trees pushed over; sign boards damaged.
1	79-117	1	86-110	MODERATE DAMAGE: The lower limit is the beginning of hurricane wind speed. Roof surfaces peeled off; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
2	118-161	2	111-135	CONSIDERABLE DAMAGE: Roofs torn off from houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
3	162-209	3	136-165	SEVERE DAMAGE: Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.
4	210-261	4	166-200	DEVASTATING DAMAGE: Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown; large missiles generated.
5	262-317	5	Over 200	INCREDIBLE DAMAGE: Strong framed houses lifted off foundations and carried considerable distances to disintegrate; automobile-sized missiles fly through air in excess of 100 yards; trees debarked.

Source: National Weather Service (2014)

### Historical Occurrences

According to the National Weather Service (Birmingham Forecast Office) Tornado Database, since 1950 there have been a total of 36 documented tornado events in Pike County, resulting in zero (0) fatalities, 15 injuries, and multiple instances of substantial property damages. Sixty-nine (69%) of documented tornadoes have been classified as F0/EF0 or F1/EF1, with 19% classified as F2/EF2, and 11% classified as F3/EF3. There have never been any documented tornadoes classified as F4/EF4 or F5/EF5 in the region county (Figure A.4.7 and Table A.4.9), though multiple F4/EF4 tornadoes have occurred in neighboring counties. The 2015 EF1 tornado in Troy caused seven (7) injuries, demonstrating that relatively weak tornadoes may cause casualties depending on the incident location. Though no fatalities due to tornadoes have been recorded in Pike County, events in neighboring counties during the past ten year period demonstrates that tornado events up to EF4 intensity with multiple fatalities and injuries, in addition to extensive property damage, could be experienced by Pike County.

Figure A.4.7: Historical Tornado Tracks



Source: National Weather Service; SEARP&DC (2016)

**Table A.4.9 Annual Tornado Summary – Pike County**

Year	Tornadoes	Fatalities	Injuries	Damages	F0/EF0	F1/EF1	F2/EF2	F3/EF3	F4/EF4	F5/EF5
1950	0	0	0	0						
1951	0	0	0	0						
1952	0	0	0	0						
1953	0	0	0	0						
1954	1	0	2	1 house destroyed, 3 other houses sustained minor damage		1				
1955	0	0	0	0						
1956	0	0	0	0						
1957	0	0	0	0						
1958	1	0	0	1 house and 1 barn destroyed			1			
1959	0	0	0	0						
1960	0	0	0	0						
1961	2	0	2	1 house destroyed, 3 other houses sustained minor damages		1	1			
1962	1	0	0	16 structures sustained minor to moderate damage			1			
1963	0	0	0	0						
1964	0	0	0	0						
1965	0	0	0	0						
1966	0	0	0	0						
1967	0	0	0	0						
1968	0	0	0	0						
1969	2	0	0	2 houses destroyed, 5 others sustained minor damage, 2 barns destroyed		2				
1970	0	0	0	0						
1971	3	0	0	6 houses were destroyed, various small structures sustained minor damage in rural areas		1		2		

Year	Tornadoes	Fatalities	Injuries	Damages	F0/EF0	F1/EF1	F2/EF2	F3/EF3	F4/EF4	F5/EF5
1972	1	0	0	A mobile home park sustained minor to moderate damage			1			
1973	1	0	0	Several structures sustained severe roof damage		1				
1974	3	0	1	1 chicken house destroyed, several houses and mobile homes sustained minor to moderate damage, storm caused several vehicle accidents along US 231.			1	2		
1975	0	0	0	0						
1976	0	0	0	0						
1977	0	0	0	0						
1978	0	0	0	0						
1979	0	0	0	0						
1980	0	0	0	0						
1981	1	0	0	1 barn was destroyed		1				
1982	0	0	0	0						
1983	0	0	0	0						
1984	0	0	0	0						
1985	0	0	0	0						
1986	1	0	1	1 house, 1 mobile home, 1 chicken house, and 1 industrial building were destroyed			1			
1987	0	0	0	0						
1988	0	0	0	0						
1989	2	0	0	Pike County Elementary sustained minor damage, 1 industrial facility and 1 other house were destroyed		2				
1990	0	0	0	0						
1991	0	0	0	0						

Year	Tornadoes	Fatalities	Injuries	Damage	F0/EF0	F1/EF1	F2/EF2	F3/EF3	F4/EF4	F5/EF5
1992	0	0	0	0						
1993	0	0	0	0						
1994	0	0	0	0						
1995	0	0	0	0						
1996	0	0	0	0						
1997	0	0	0	0						
1998	3	0	0	0	2	1				
1999	0	0	0	0						
2000	1	0	0	1 mobile home destroyed, several other mobile homes sustained major damage		1				
2001	2	0	0	Several structures sustained minor roof damage	1	1				
2002	0	0	0	0						
2003	0	0	0	0						
2004	2	0	0	0	2					
2005	0	0	0	0						
2006	0	0	0	0						
2007	0	0	0	0						
2008	3	0	0	Minor roof damage to several houses and major damage to 2 chicken houses	2	1				
2009	0	0	0	0						
2010	0	0	0	0						
2011	0	0	0	0						
2012	3	0	2	Minor roof damage sustained by multiple homes, minor damage to several chicken houses, moderate damage to two mobile homes		2	1			
2013	0	0	0	0						
2014	1	0	0	0		1				

Year	Tornadoes	Fatalities	Injuries	Damage	F0/EF0	F1/EF1	F2/EF2	F3/EF3	F4/EF4	F5/EF5
2015	1	0	7	Moderate damage to Walmart and nearby strip mall in Troy		1				
2016 to date	1	0	0	Moderate damage to several houses		1				

Source: National Weather Service Birmingham, Alabama Tornado Database (2016)

### Probability of Future Events

Since 1950, jurisdictions within Pike County has averaged approximately one (1) tornado occurrences every two (2) years Pike County experienced nine (9) tornado events in the most recent ten-year period resulting in a 90% probability that a tornado event will occur on an annual basis. Based on this historical data, the annual probability for tornado events are High.

## **SEVERE THUNDERSTORM (HIGH WINDS / HAIL / LIGHTNING)**

### **Background**

Thunderstorms are weather events that form through the clash of different air masses, which may cause storms that occur singularly, in lines, or in clusters. The effects of thunderstorms may impact a small area or multiple jurisdictions. Thunderstorm events may cause straight-line winds, hail, and lightning, and if long-lasting or severe, may cause flooding or tornadic activity. Severe thunderstorms may produce damage equivalent to tornadoes over a larger spatial area. Severe thunderstorm events may occur year-round in the region, but the peak of severe thunderstorm events are in spring with a smaller peak in fall.

Straight-line winds from severe thunderstorms may cause wind gusts of hurricane strength that creates property damage, downed trees, and downed power lines.

Hail is ice crystals that sometimes accompany thunderstorms. Hailstones are formed by accumulation due to rapid rising of warm air with subsequent cooling of the air mass. More variance in air temperature may lead to increased diameter of hailstones. When the hailstones reach the ground, they have the potential to cause minor to moderate property damage, especially to roofs and vehicles.

Lightning is a discharge of electrical energy that creates a “bolt” that may stretch from clouds to the ground. An actual lightning strike only affects a small area, though many storms have thousands of lightning strikes that occur during an event. According to the National Weather Service, lightning will follow a path of least resistance, typically striking the tallest object in a given area, which could include a person, a power pole, or trees. Lightning may cause building damage due to starting a fire, deaths through striking a person directly or in the immediate vicinity, and may cause wildfires in some cases.

### **Locations Affected**

The entire area within Pike County is uniformly susceptible to the occurrence of severe thunderstorms. Severe thunderstorms can be assumed to potentially affect any location in the county, due to occurrences being randomly located and the impossibility of predicting specific areas of storm effects.

### **Extent**

Severe thunderstorms are defined by the National Weather Service as having wind speeds of 58 miles per hour or higher, producing hail at least three quarters inch (3/4”) in diameter, or possessing tornadic capabilities. The effects of severe thunderstorms will have varying spatial effects throughout the planning area from widespread to localized impacts. Severe thunderstorms with straight line winds that affect Pike County can create wind gusts up to the equivalence of an EF1 tornado.

### **Historical Occurrences**

Severe thunderstorms, through high winds, hail, or lightning, have caused at least 28 instances of documented damages in Pike County since 2010 causing one (1) injury and approximately \$63,750 worth of damage.

Due to the isolated nature of many of these events, it is probable that many other damaging occurrences of high winds, hail, and lightning events have occurred, but have gone unreported or unrecorded.

### **Probability of Future Events**

Severe thunderstorm events that cause property damage and potential casualties may affect jurisdictions within Pike County throughout the year and have averaged multiple occurrences a year in recent history. This recent history of damaging events causes Pike County to have a High probability of severe thunderstorm occurrences.

# **LANDSLIDE**

## **Background**

A landslide is a gravity-aided downward and outward movement of soil, rock, and vegetation that lies normally on a sloped surface. Landslides can occur from both natural and human-induced events. Common causes are composition changes on the surface, excessive rain, and construction practices.

Typically, areas that are prone to landslides are on or at the base of steep slopes, base of drainage channels, developed hillsides where leach field septic systems are used, and near previous landslide areas.

## **Locations Affected**

The United States Geological Survey (USGS) documents that Pike County has low incidence and low susceptibility of landslides occurring (Figure A.4.8), which means that less than 1.5% of the area is potentially affected by a landslide. There is little documentation from the USGS, the Geological Survey of Alabama (GSA), previous local plans, or the public regarding historical landslide incidents.

## **Extent**

There is no magnitude scale for landslides. Therefore, defining the extent of landslides is subjective and difficult to predict. Due to the lack of susceptibility throughout the planning area, the extent of landslide incidents are estimated to be primarily isolated damages to structures and infrastructure.

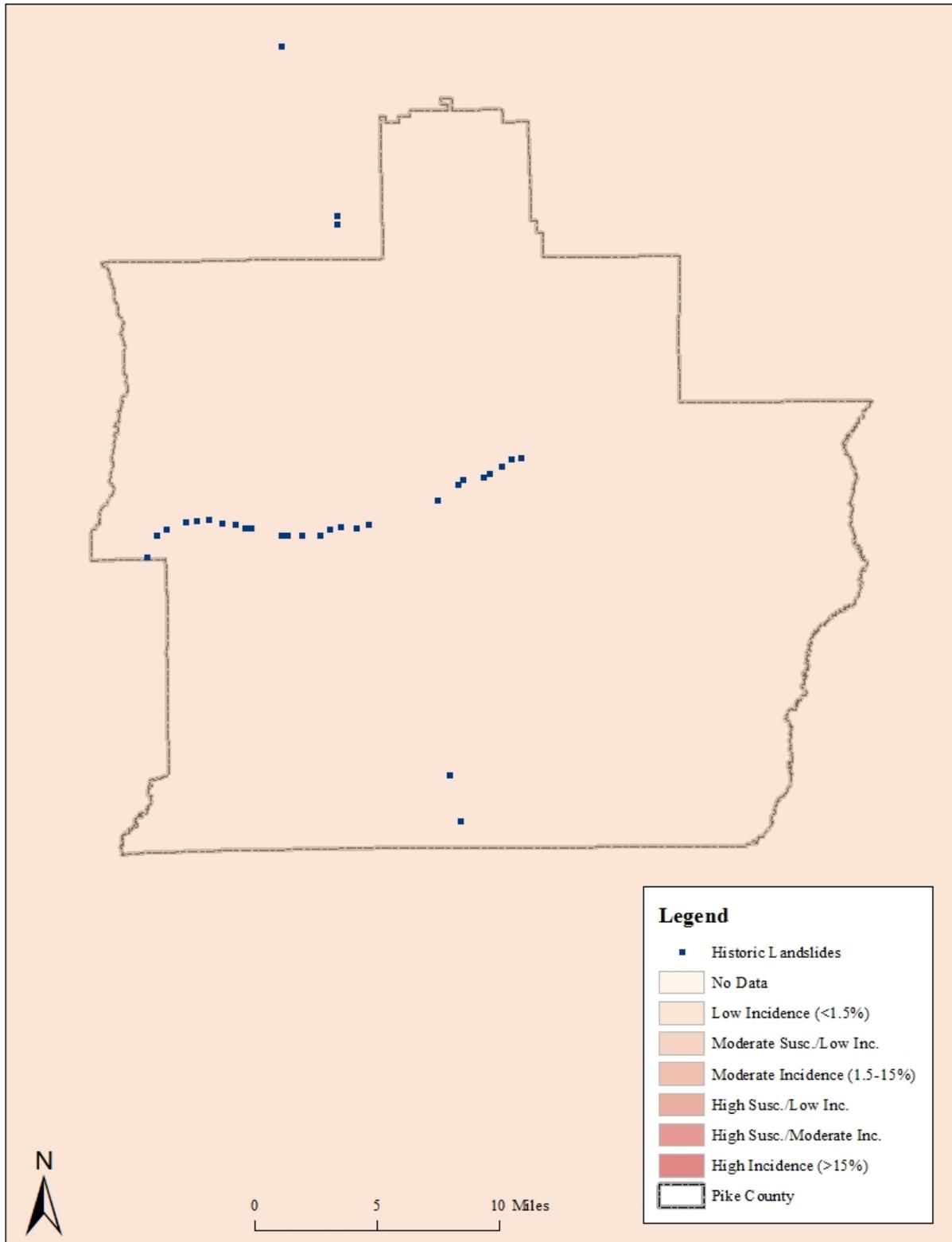
## **Historical Occurrences**

The GSA has a map that displays historical landslides (data used in Figure A.4.8). However, the data was digitized in 1982 and there is no date listed on the GSA map detailing total time frame, so it is from an indeterminate amount of time. Pike County is shown to have several incidents. However, there is no specific documentation of any of these landslide events. It is believed that each incident was very localized and minor in nature. There are no damage estimates available for the recorded incidents.

## **Probability of Future Events**

Based on historical information and susceptibility data from the USGS and the GSA, the probability of future landslide events is Low. It is anticipated that most future incidents of landslides will be due to human activity and not due to natural events.

**Figure A.4.8: Pike County Landslide Incidence and Susceptibility**



Source: National Atlas of the United States; Geological Survey of Alabama; SEARP&DC (2016)

## **LAND SUBSIDENCE / SINKHOLES**

### **Background**

According to the Geological Survey of Alabama (GSA), the most common cause of land subsidence in Alabama is development of sinkholes in areas that have underlying soluble limestone, dolomite, or salt rocks, such as karst terrain. Activities that can cause land subsidence, or sinkholes, include a change in the water table level, change in groundwater flow characteristics, and surface loading that puts pressure on the land surface, including human-induced causes.

Any sinkholes formed in Pike County would be regarded as minor and research has not shown any reports of damage in recent history, as there were no reports of land subsidence damage caused by the excessive droughts of the past several years.

### **Locations Affected**

The Alabama State Hazard Mitigation Plan states that the GSA considers sinkholes to be more prevalent in northern Alabama than in the planning area. The United States Geological Survey (USGS) shows there are areas of carbonate rock and karst terrain within the Pike County's underlying geology. There is little documentation from the USGS, the Geological Survey of Alabama (GSA), previous local plans, or the public regarding historical land subsidence incidents or impacts in the county.

### **Extent**

There is no magnitude scale for land subsidence or sinkholes. Therefore, defining the extent of these hazards is subjective and difficult to predict. Due to the lack of historical data pertaining to the damage of land subsidence in Pike County, the extent of land subsidence incidents are estimated to be primarily isolated damages to structures and infrastructure.

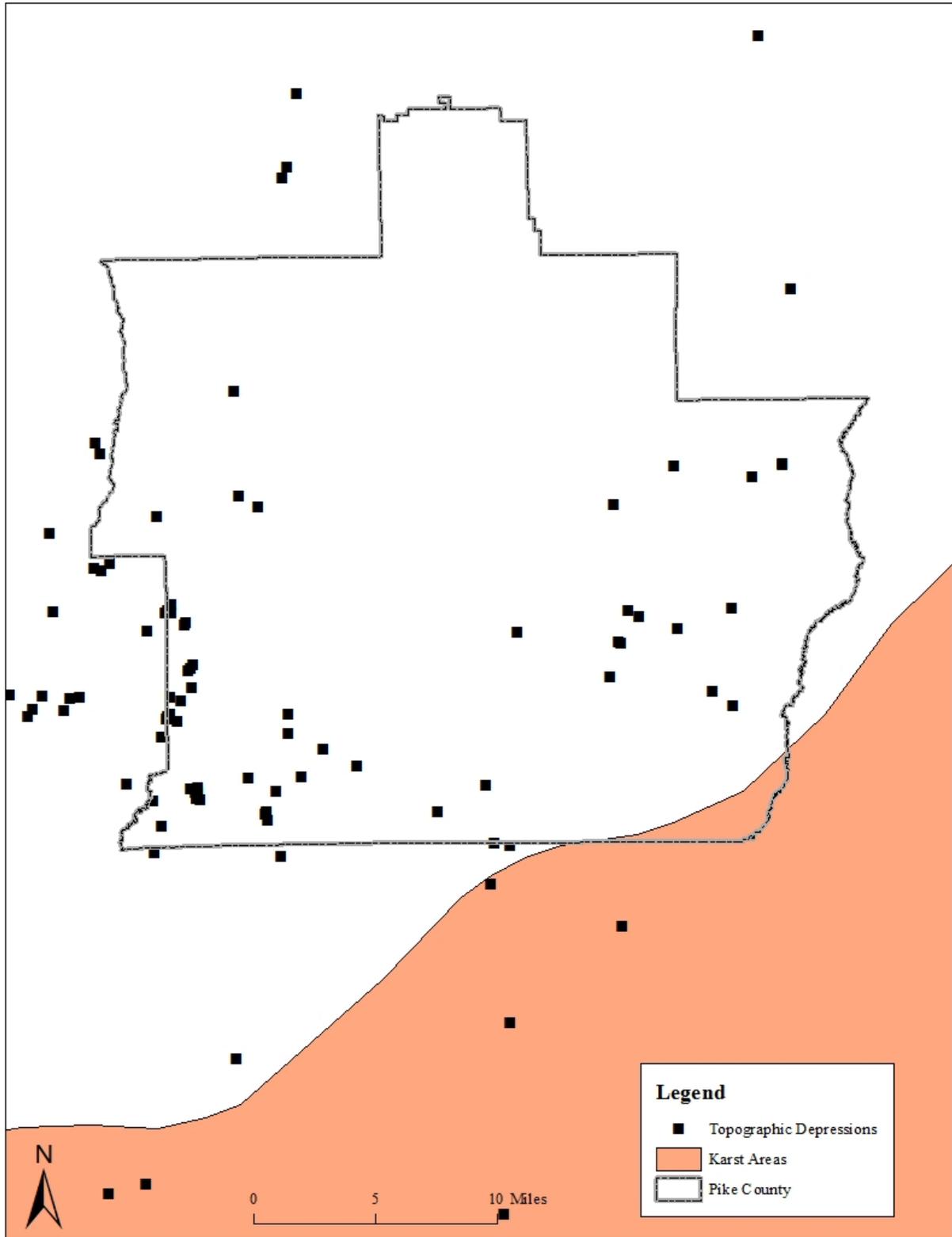
### **Historical Occurrences**

The GSA displays areas of topographic depressions mapped from elevations from topographic maps, much of which are presumed natural sinkholes (Figure A.4.9). However, the mapped depressions are from older topographic maps, so additional depressions could have formed since. It is believed that each areas of land subsidence have been very localized and minor in nature. There are no damage estimates available for the recorded incidents.

### **Probability of Future Events**

Based on historical information and susceptibility data from the USGS and the GSA, it is difficult to quantify any future incidence of land subsidence. Based on research of land subsidence in Alabama and limited documentation of previous occurrences, it is believed that future occurrences would provide very minimal impact. There have been no reports of land subsidence damage in the past several years, even though there have been multiple periods of drought and flooding during the time period. The probability for future land subsidence incidents would be regarded as Low.

**Figure A.4.9: Pike County Topographic Depressions and Karst Terrain**



*Source: Geological Survey of Alabama (GSA); SEARP&DC (2016)*

# **WILDFIRE**

## **Background**

Wildfires occur from debris burning and other incendiary causes, which can spread throughout forested areas and affect development within wildland urban interface (WUI) areas. Fuel sources, such as trees and grass, and weather, such as dry periods or lightning strikes, can contribute to wildfires in Pike County.

## **Locations Affected**

Wildfire risk maps produced by the Southern Group of State Foresters (Figure A.4.10) illustrates that Pike County has a mixture of moderate and higher WUI areas, especially near Troy and Brundidge. Most of the outlying areas in the county has minor WUI risk, but has susceptibility for wildfires.

## **Extent**

The magnitude of wildfire events are often classified as total number of acres burned and destructive impacts to people and property, including house fires and casualties. These elements are greatly dependent on other factors, such as weather conditions, available fuel, topography, and existing wildfire mitigation capabilities. Pike County has been fortunate to not have any major recorded wildfires in recent history. As population and development increases in populated areas, such as Troy, the WUI should be monitored for potential wildfire effects. The combination of cultivated fields, wide roadways, and streams serve as both manmade and natural firebreaks.

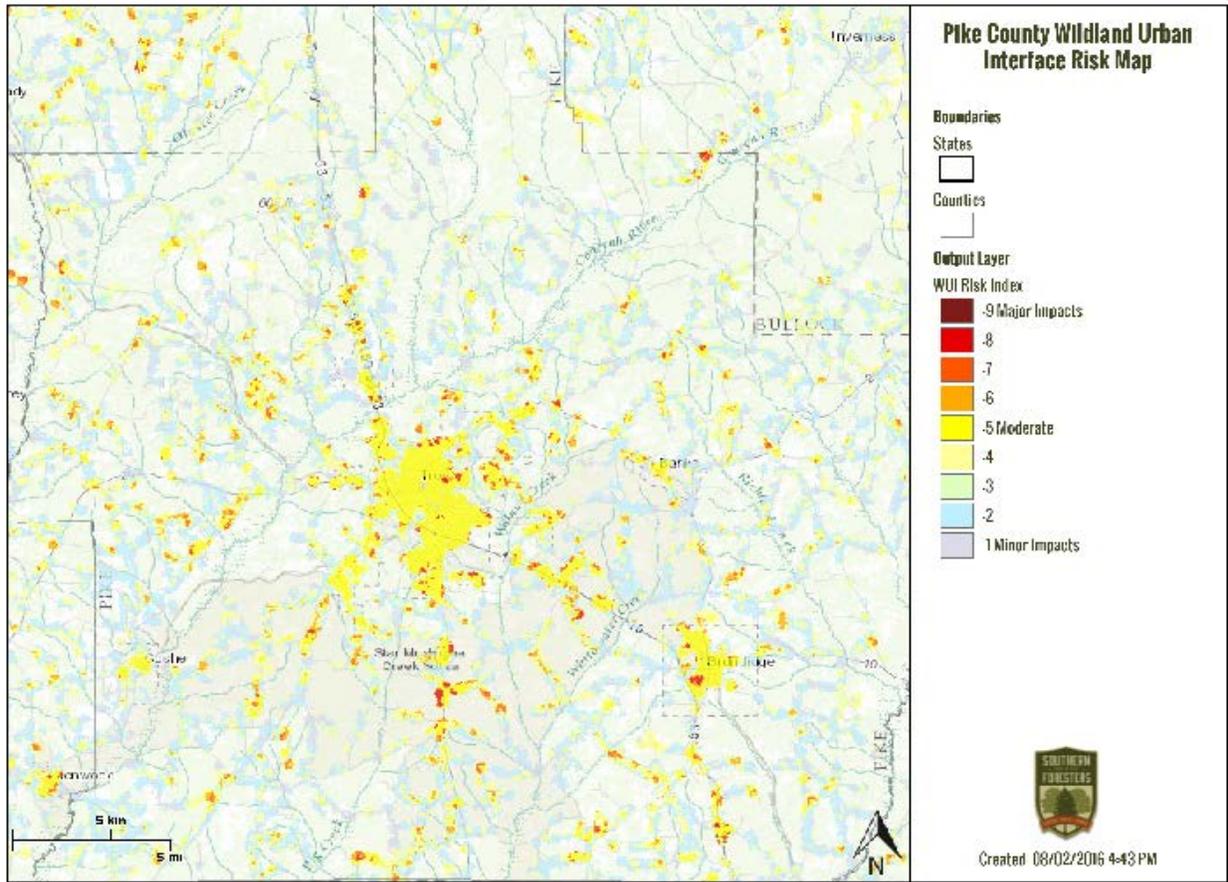
## **Historical Occurrences**

Most locations in Pike County have historical wildfire occurrences, with most instances being minor in nature. Predominantly, areas where wildfires occur have been primarily very rural areas of the county. There have been no recorded wildfires in the National Climatic Data Center's (NCDC) Storm Events Database.

## **Probability of Future Events**

The Southern Group of State Foresters Wildfire Risk Assessment Portal classifies all Pike County municipalities as having at least a Moderate WUI Risk Index, with some isolated areas rated as higher risk. These ratings were developed based on comparing housing density to a susceptibility index. Though multiple isolated wildfires occur each year in rural areas of Pike County, these have been minor in nature and have not greatly impacted the area. Therefore, the entire planning area will be regarded to have a Medium probability for major damage from wildfire events.

**Figure A.4.10: Pike County Wildfire Risk Map**



Source: Southern Group of State Foresters (2016)

## **WINTER STORM**

### **Background**

Winter storms normally cause heavy amounts of frozen precipitation (snow, freezing rain, and ice), windy conditions, and extreme cold. The effect of winter storms on a community depends on how equipped the community is to handle the storm, as winter storms can cause power outages, transportation problems, and collapsed roofs on structures. These events may make roads impassable and disrupt power. A snowfall of two inches or more is considered heavy snow for Alabama, especially in the southeastern portion of the state. Loss of communications is a common occurrence during a severe winter storm. The related emergencies include hypothermia and other cold-related maladies. Fires due to improvised heating apparatuses are common, as is carbon monoxide poisoning. There usually is sufficient warning for the public to take protective steps. The facilitation of emergency heating and food is critical. A 72- hour emergency kit is crucial in this emergency. Emergency heating centers will be essential and rescue of stranded motorists may be a priority. These events are typically short lived in Pike County. Damage to crops such as timber can be devastating. Emergency power and heating are essential for shelters and other critical facilities. The ability to remove debris such as trees with chain saws and heavy equipment is essential. The ability to apply sand or salt to maintain roads in a passable state is important to allow emergency vehicles and evacuation of affected areas. This type of emergency may affect a large segment of the population and strain shelter resources.

### **Locations Affected**

Pike County receives winter storms very infrequently and have had only minor recorded damages. The entire county is susceptible to a winter storm if one were to develop this far south.

### **Extent**

Winter storms may have varying effects on Pike County. The few winter storms documented in the area has caused a few inches of ice and/or snow, which may cause tree and property damage, and exacerbate dangerous road conditions. Normally in a winter storm event, most non-essential business close for a few days until the weather modifies, which causes some measure of economic loss.

### **Historical Occurrences**

In February 1973, Pike County received up to a foot of snow and ice that left many areas without power and roads impassable. The “Blizzard of 1993” also brought some winter weather effects and frigid cold temperatures to the area. There were minor winter weather events over portions of Pike County in December 1996 and January 2002. Pike County received several inches of snow in February 2010, causing roads and business to close. Most recently, in January 2014, a system moved through that caused a layer of one to two inches of mixed precipitation (mostly ice) to freeze on roads. This system caused most normal operations to shut down at least two days and caused some property damage due to falling trees and frozen pipes.

### **Probability of Future Events**

Due to the infrequency of winter storm occurrences in Pike County and their short duration of effects, there is a Low probability for major damage caused by a winter storm.

### **A.4.3 Technological and Human-Caused Hazards**

Pike County has susceptibility to technological and human-caused hazards. General discussions of hazards that may affect the planning area are described in the subsections below.

#### **Structure Fire**

Prevention and control are requirements in the building codes and zoning ordinances in many jurisdictions. The most vulnerable structures to fire other than wildfires would likely be those in commercial districts of each jurisdiction. This is primarily due to the close proximity of the structures in these areas. The City of Troy is generally well-equipped to deal with structure fires that occur in their response area. Rural jurisdictions are primarily served by Volunteer Fire Departments that are continuing to improve the service to their community and have varying ISO ratings and are utilizing funds provided by local legislation and FEMA grants.

#### **Hazardous Materials**

There are several areas within Pike County with many industries and commercial businesses. Many of these businesses and industries handle various types and quantities of hazardous materials. Hazardous materials are an ongoing potential hazard due to the large amount of transporting the materials throughout the region. Areas near U.S. Highway 231, U.S. Highway 29, multiple state highways, and the CSX Railroad are particularly vulnerable to HM incidents because of the shipping of hazardous materials through the commercial and residential districts. A rail accident with hazardous materials would be catastrophic in regards to loss of life and property damage, especially in the Troy and Brundidge areas. There would be little to no time to evacuate the endangered area. Most jurisdictions have a warning network that quickly notifies the public and gives them time to evacuate or escape a rapidly developing incident. Hazardous materials are tracked through the Local Emergency Planning Committee and information is disseminated to local first responders.

#### **Terrorism**

FEMA classifies terrorism as using illegal force or violence against persons or property for purposes of intimidation or ransom. Groups that are both domestic and foreign in nature, with differing political or religious views may aim for terrorism tactics. The threat of terrorism places certain facilities in greater risk, including government facilities, high profile areas, and utility infrastructure. Different types of terror acts are described below.

Biological or Chemical Attack: Liquid or other contaminants that can be dispersed to cause casualties and negative psychological impact.

Conventional Attack: Active shooter type of situation that is normally an individual or small group that create havoc in a particular area for different means.

Cyber Attack: Normally used to gain information or negatively affect operations due to intrusion into computer systems.

Hostage Situation: Holding people against their will in order to achieve demands, which can be on the realm from international political situations to local domestic situations.

State and local agencies regularly conduct exercises and plan for this potential to incorporate Emergency Service Functions and the State, Federal Emergency Response Plan, and the National Incident Command System. Many local utilities have undertaken a risk assessment of their water system and sewer facilities to determine if any additional security measures are needed for implementation of those mitigating features.

### **School Violence**

Incidents of school violence provides a disruption to the learning process and causes negative perceptions to local schools and the overall community. School violence may range from isolated bullying to an active shooter situation. The wide variance of school violence possibilities presents a planning complexity to local stakeholders that must allocate particular resources to train and prepare for a multitude of situations.

#### A.4.4 Vulnerability Overview

Table A.4.10 provides criteria to assist in a qualitative assessment of the risk and potential impact of each identified hazard. Assigned risk levels were determined based on the hazard profiles developed earlier in this section. The classifications generated from this table assists in the prioritization of hazard risk through objectively looking at the possible scope of the studied hazards. In order to quantify the risk classifications, varying degrees of risk factors (probability, impact, location extent, warning time, and duration) were assigned a value of “1” to “4” and weighted in order to create a total value with a maximum score of 4.0.

**Table A.4.10: Risk Index for Pike County Hazards**

Category	Level	Criteria	Index Value	Weighted Factor
<b>Probability</b>	Very Low	Less than 1% annual probability	1	30%
	Low	Between 1% and 10% annual probability	2	
	Medium	Between 10% and 100% annual probability	3	
	High	100% annual probability	4	
<b>Impact</b>	Minor	Very few injuries, if any occur. Only minor property damage and minimal disruption of quality of life. Temporary shutdown of critical facilities	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for one month or more.	4	
<b>Location Extent</b>	Negligible	Less than 1% of area affected.	1	20%
	Small	Between 1% and 10% of area affected.	2	
	Moderate	Between 10% and 50% of area affected.	3	
	Large	Between 50% and 100% of area affected.	4	
<b>Warning Time</b>	More than 24 hours	Self-explanatory	1	10%
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
<b>Duration</b>	Less than 6 hours	Self-explanatory	1	10%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	

Table A.4.11 assigns a qualitative risk impact assessment for each hazard, based from the hazard profiles created in this section and other input from plan stakeholders. The results were used in calculating the values for each hazard in order to prioritize the regional impacts of identified hazards in this plan.

**Table A.4.11: Summary of Pike County Hazards Risk Impact**

Hazard	Degree of Risk					
	Probability	Impact	Location Extent	Warning Time	Duration	Weighted Score
<b>Dam Failure</b>	Very Low	Limited	Small	12 to 24 hours	Less than 6 hours	1.6
<b>Drought/Extreme Heat</b>	Medium	Minor	Small	More than 24 hours	More than one week	2.1
<b>Flooding</b>	Medium	Limited	Moderate	6 to 12 hours	Less than one week	2.7
<b>High Winds – Hurricanes</b>	Medium	Critical	Large	More than 24 hours	Less than 24 hours	2.9
<b>High Winds – Tornadoes</b>	Medium	Critical	Small	Less than 6 hours	Less than 6 hours	2.7
<b>High Winds – Severe T-storms</b>	High	Minor	Moderate	Less than 6 hours	Less than 6 hours	2.6
<b>Landslides</b>	Low	Minor	Negligible	Less than 6 hours	Less than 6 hours	1.6
<b>Land Subsidence / Sinkholes</b>	Low	Minor	Small	Less than 6 hours	Less than 6 hours	1.8
<b>Wildfire</b>	High	Minor	Negligible	Less than 6 hours	Less than one week	2.3
<b>Winter Storms</b>	Low	Limited	Large	More than 24 hours	Less than one week	2.4

Based from the results of the hazard assessment summary, the highest priority hazards for Pike County and its jurisdictions are High Winds-Hurricanes (2.9 Score), High Winds-Tornadoes (2.7 Score), Flooding (2.7 Score), and High Winds-Severe Thunderstorms (2.6 Score). It should be noted that this assessment is just a categorization of most likely factors for each hazard.

### A.4.5 Probability of Future Occurrences and Loss Estimation

Table A.4.12 estimates hazard event frequency of occurrence cumulatively for Pike County. These estimates were calculated from events recorded at different time periods, based on source data, which is described below, and to be consistent with the Regional Hazard Mitigation Plan. There is no guarantee the recorded level of hazard events will continue into the future at the same rate. However, the figures below will provide at least a possible estimate of potential damages.

The time scales for each recorded hazard is listed below (when known and/or applicable) in Table A.4.12:

**Dam Failure:** Unknown (no recorded incidents)

**Drought / Extreme Heat:** 1990 through 2015

**Flooding:** 1990 through 2015

**High Winds:** 1990 through 2015

**Landslides:** Unknown

**Land Subsidence / Sinkholes:** Unknown

**Wildfires:** 1997 through 2012

**Winter Storms:** 1990 through 2015

**Table A.4.12: Natural Hazard Probability and Damage Estimates**

Hazard	Occurrences	Time (Years)	Damages Recorded	Probability (Annual)	Estimated Future Damage (Annual)
<b>Dam Failure</b>	0	N/A	N/A	N/A	N/A
<b>Drought / Extreme Heat</b>	4	25	N/A	16%	N/A
<b>Flooding</b>	11	25	\$185,000	1 event per 2.2 years	\$7,400
<b>High Winds</b>	57	25	\$4,197,000	2.3 events per year	\$167,880
<b>Landslides</b>	N/A	N/A	N/A	N/A	N/A
<b>Land Subsidence / Sinkholes</b>	N/A	N/A	N/A	N/A	N/A
<b>Wildfires</b>	280	16	N/A	17.5 events per year	N/A
<b>Winter Storms</b>	3	25	\$35,000	1 event per 8 years	\$1,400

Sources: National Climatic Data Center (NCDC), Alabama EMA

**Dam Failure:** The risk of losses from dam failure cannot be calculated based on historic records due to lack of data. Even though dam failure is a rare occurrence and is unprecedented in Pike County, an occurrence could cause critical damages downstream, especially areas near the Patsaliga, Pea, and Conecuh rivers and their tributaries.

**Drought/Extreme Heat:** The risk of losses from drought and extreme heat cannot be calculated based on historic records due to lack of data. Qualitative documentation shows evidence that drought and extreme heat conditions cause agricultural losses and water quantity issues, but it is difficult to define the exact impact from this hazard.

**Flooding:** The planning area has recorded at least 11 flooding events in the last quarter century causing an estimated \$185,000 in damages. The amount of losses for flooding makes it the second highest damaging hazard in Pike County.

**High Winds (Hurricanes, Tornadoes, Severe Thunderstorms):** Pike County has incurred at least 57 high wind events over the past quarter century causing an estimated \$4,197,000 in damages. The amount of losses for high wind events of varying types makes it the highest damaging hazard in Pike County.

**Landslides:** The risk of losses from landslides cannot be calculated based on historic records due to lack of data. Though a few incidents of landslides have been recorded in Pike County before 1982, there is no damage estimated attached to those events. Any landslide occurrence in the planning area would most likely be minor in impact due to the localized nature of these events.

**Land Subsidence / Sinkholes:** The risk of losses from land subsidence events, such as sinkholes, cannot be calculated based on historic records due to lack of data. Though areas of Pike County has depressions noted on topographic maps or has karst terrain, information about previous incidents are limited at best with no damage estimates. Any land subsidence occurrence in the planning area would most likely be minor in impact due to the localized nature of these events.

**Wildfires:** Though wildfires are the most likely hazard to occur in Pike County, with an average of 17.5 wildfire events over a 16-year period, the impact of wildfires have been very minor and localized in mostly undeveloped areas. Though historically, wildfires have only affected timber resources in Pike County, future development in wildland urban interface areas should be mindful of this potential hazard.

**Winter Storms:** Pike County has incurred three (3) winter storm events with recorded damages, including snow and ice, over the past quarter century causing an estimated \$35,000 in damages. These events normally have a short duration and have minor impacts, though Pike County is not especially prepared for a long duration event, if it would occur.

#### **A.4.6 Total Population and Property Valuation Summary by Jurisdiction**

This data in Table A.4.13 is derived from local municipal government and tax valuation from the local revenue offices, as well as 2010 Census population. This data is for Tax Year 2016. This data provides an estimate of total exposure in the planning area.

**Table A.4.13: Total Population and Property Information by Jurisdiction**

<b>Jurisdiction</b>	<b>2010 Total Population</b>	<b>Parcels</b>	<b>Number of Buildings</b>	<b>Total Appraised Value of Improvements</b>
Pike County (Uninc.)	14,866	12,434	3,654	\$398,806,290
Town of Banks	179	132	73	\$4,099,630
City of Brundidge	2,076	1,538	1,041	\$103,848,550
Town of Goshen	266	281	133	\$12,374,260
City of Troy	18,033	7,513	5,486	\$763,700,277

*\* Included in County's unincorporated amount*

*Source: Pike County Revenue Office (Alabama GIS) (July 2016)*

It is important to note that actual values may be somewhat higher than those values assigned for tax purposes. Also, these values do not include tax-exempt structures such as government buildings and churches.

### A.4.7 Critical Facilities/Infrastructure by Jurisdiction

Critical facilities are defined as facilities that are essential to the community, or may be crucial to the delivery of vital services, such as utilities and public safety. Critical facilities may also house or serve an at-risk population such as schools, hospitals, or nursing homes. Critical facilities would also likely result in catastrophic financial loss if severely damaged or destroyed, such as major industrial buildings, courthouses, and other government facilities. Critical facilities may vary from a transmission line that provides vital electricity to the community, to a hospital that provides medical care, or to the local public safety facilities that serve a community.

A concerted effort was made using information from the public, EMA, local government officials and industry stakeholders to identify the critical facilities. Such facilities were considered vital to transportation, energy, communication, health care, utility systems, food services, and the delivery of public safety. Structures that are occupied by at-risk populations such as schools are also included. The information listed below was provided by the individual jurisdictions.

Other critical facilities locations are the facilities that store Extremely Hazardous Substances (EPCRA Section 302-Extremely Hazardous Substances, CERCLA Hazardous Substances, EPCRA, Section 313 Toxic Chemicals, CAA 122®) Regulated Chemicals for Accidental Release Prevention and other facilities that are covered. The Pike County EMA office maintain these lists.

Table A.4.14 lists a summary of critical facilities summarized by type within the Pike County jurisdictions. This list is not all-inclusive and includes facilities prioritized by specific jurisdictions. The Pike County EMA maintains a specific inventory of critical facilities for the county’s jurisdictions. An inventory of critical facilities will be reviewed periodically and continually updated to reflect any changes in each of the jurisdictions.

**Table A.4.14: Critical Facility Summary**

<b>Facilities</b>	<b>Pike County</b>	<b>Banks</b>	<b>Brundidge</b>	<b>Goshen</b>	<b>Troy</b>
Fire / Rescue	5	1	1	1	4
Law Enforcement	1	0	1	0	3
Hospital / Health Dept	1	0	0	0	2
Schools	0	2	2	2	50
Continuity of Government	2	1	1	1	2

Source: Pike County Stakeholder Committee

### A.4.8 Hazard Impacts

This section provides a narrative overview of each hazard’s impact on the planning area in Pike County, based on previous findings within this section.

#### DAM FAILURE

According to the Risk Impact Assessment, the dam failure hazard scored a value of 1.6 (from a scale of 0 to 4).

**Table A.4.15: Risk Impact Assessment for Dam Failure**

Probability	Very Low
Impact	Limited
Location Extent	Small
Warning Time	12 to 24 hours
Duration	Less than 24 hours

Dam regulation and research is an ongoing hazard mitigation issue in the State of Alabama. Currently, there are no state laws to regulate existing private dams or the construction of new private dams that do not require federal licenses or inspections. There have been four attempts to pass legislation requiring inspection of dams on bodies of water over 50 acre-feet or dams higher than 25 feet. Opposition of agricultural interest groups and insurance companies has hampered enactment.

Information pertaining to potential damages from dam failure is limited at the current time. The ADECA Office of Water Resources is currently conducting a dam study, as data listed within the National Inventory of Dams (NID) is outdated and not entirely accurate according to preliminary findings by ADECA. Once the dam assessment is complete, information regarding high hazard dams should allow for additional studies pertaining to potential vulnerability of this hazard.

Given the lack of historical loss data pertaining to dam failure, it is assumed that an event, could potentially result in localized damages, but estimating damage losses over a long period of time yields a very low loss estimate overall.

## **DROUGHT / EXTREME HEAT**

According to the Risk Impact Assessment, the drought / extreme heat hazard scored a value of 2.1 (from a scale of 0 to 4).

**Table A.4.16: Risk Impact Assessment for Drought / Extreme Heat**

Probability	Medium
Impact	Minor
Location Extent	Small
Warning Time	More than 24 hours
Duration	More than one week

Because it cannot be predicted where drought and extreme heat may occur, all existing and future buildings, facilities, agricultural production, and depletion of groundwater resources, the general population in Pike County is considered to be vulnerable to this hazard and its impacts. Residents that are very young or advanced in age are more susceptible to health effects from extreme heat. Extreme heat may stress electrical utility providers, due to increased air condition requirements. Need for health services may also increase due to extreme heat. However, due to ongoing planning and relative common occurrence of these hazards, anticipated future damages or losses are expected to be minimal.

All existing and future buildings in Pike County are vulnerable to effects from drought and extreme heat. More importantly, all agricultural products and other natural resources are at risk. However, it is difficult to estimate values for damages, including crop failure, that are primarily due to drought and extreme heat issues. Due to the varying nature of this hazard, damages are caused to crop losses and issues to water supplies, but there is little methodology to calculating loss estimates that are due to these hazards.

## FLOODING

According to the Risk Impact Assessment, the flooding hazard scored a value of 2.7 (from a scale of 0 to 4).

**Table A.4.17: Risk Impact Assessment for Flooding**

Probability	Medium
Impact	Limited
Location Extent	Moderate
Warning Time	6 to 12 hours
Duration	Less than one week

In the last quarter century, \$185,000 of damages have occurred from flooding in Pike County, primarily from flash flooding.

The primary areas affected by riverine flooding in the planning area are along the Pea River, Conecuh River, and major tributaries to those rivers. Other areas inside the floodplains are streams and creeks throughout the counties and the municipalities. The NFIP has identified flood zones in areas of each jurisdiction.

Flash flooding may potentially affect all residents of Pike County, especially urbanized areas, and cause runoff that becomes fast-rising waters that can cause property and street damage as well as casualties. Unlike riverine flooding, which can be forecasted over a few days, flash flooding is normally a quick onset hazard with little warning.

Riverine and flash flooding may occur any time of year, though flooding associated with heavy rains during hurricanes will occur in summer and early autumn.

### **Historical Insured Flood Losses**

According to FEMA flood insurance policy records as of August 2014, there have been no flood losses reported through the NFIP since 1970 in Pike County. There are 25 NFIP-insured properties in Pike County. It is likely that there are flood losses not reported, in uninsured structures, or denied payment.

### **Repetitive Loss Properties**

A repetitive loss property is an insurable structure that has had two or more claims of more than \$1,000 within any ten-year period since 1978. A repetitive loss property may or may not be currently insured by the National Flood Insurance Program (NFIP). According to the State NFIP Coordinator, there are no unmitigated repetitive loss properties in Pike County.

## **HIGH WINDS (HURRICANES, TORNADOES, SEVERE THUNDERSTORMS)**

### **HURRICANES**

According to the Risk Impact Assessment, the hurricane hazard scored a value of 2.9 (from a scale of 0 to 4).

**Table A.4.18: Risk Impact Assessment for Hurricanes**

Probability	Medium
Impact	Critical
Location Extent	Large
Warning Time	More than 24 hours
Duration	Less than 24 hours

Because hurricanes and other tropical events commonly affect a large spatial area, all existing and future buildings, facilities, and the general population in Pike County are considered to be vulnerable to this hazard and its impacts. Pike County is an inland location and will not receive some of the intensity and extent of these storms, but the magnitude of hurricanes affecting the central Gulf Coast can remain high as these storms travel inland into the region. The projected effects of hurricanes on Pike County may include additional hazards, including flooding from torrential rains, debris creation, and a lesser threat of weak tornadoes spawned by the hurricane system.

Hurricanes will provide those widespread effects during the summer and early autumn portions of the year. Normally there are a few days of warnings before a hurricane impacts the planning area allowing for preparations.

### **TORNADOES**

According to the Risk Impact Assessment, the tornado hazard scored a value of 2.7 (from a scale of 0 to 4).

**Table A.4.19: Risk Impact Assessment for Tornadoes**

Probability	Medium
Impact	Critical
Location Extent	Small
Warning Time	Less than 6 hours
Duration	Less than 6 hours

Because tornadoes may touch down anywhere within Pike County, all existing and future buildings, facilities, and the general population in the planning area are considered to be vulnerable to this hazard and its impacts. Tornadoes can occur during hurricane events or other severe thunderstorm events, which can create multiple impacts.

All of Pike County is susceptible to tornadoes. The most likely time for tornadoes is during the spring months from March through May, with a secondary peak of tornado activity in November, but tornadoes occur in every month of the year. Tornadoes present the most likely source of

property damage and injury in Pike County from a natural hazard. Tornadoes are normally more destructive than hurricanes in Pike County, but impacts are far more localized. Even though favorable conditions for tornadoes can be forecasted in advance, the location of a tornado is unknown until a few moments before the storm occurs.

**SEVERE THUNDERSTORMS**

According to the Risk Impact Assessment, the severe thunderstorm hazard scored a value of 2.6 (from a scale of 0 to 4).

**Table A.4.20: Risk Impact Assessment for Severe Thunderstorms**

Probability	High
Impact	Minor
Location Extent	Moderate
Warning Time	Less than 6 hours
Duration	Less than 6 hours

Because severe thunderstorms with high winds may occur at any location within Pike County, all existing and future buildings, facilities, and the general population in the planning area are considered to be vulnerable to this hazard and its impacts. Severe thunderstorms with high winds can also produce similar effects to tornadoes and hurricanes. These effects will be more localized than hurricane events but more widespread than tornadoes.

## LANDSLIDES

According to the Risk Impact Assessment, the landslide hazard scored a value of 1.6 (from a scale of 0 to 4).

**Table A.4.21: Risk Impact Assessment for Landslides**

Probability	Low
Impact	Minor
Location Extent	Negligible
Warning Time	Less than 6 hours
Duration	Less than 6 hours

Information from the Geological Survey of Alabama shows that historical landslide events have been very sparse across Pike County. Due to the lack of substantive documentation of previous events, it is assumed that landslides events may occur at any location within the planning area, all existing and future buildings, facilities, and the general population in the planning area is considered to be vulnerable to this hazard and its impacts. With little recorded activity and documentation, it is believed that any potential losses in the planning area would be minor in scope.

## LAND SUBSIDENCE / SINKHOLES

According to the Risk Impact Assessment, the land subsidence / sinkhole hazard scored a value of 1.8 (from a scale of 0 to 4).

**Table A.4.22: Risk Impact Assessment for Land Subsidence / Sinkholes**

Probability	Low
Impact	Minor
Location Extent	Small
Warning Time	Less than 6 hours
Duration	Less than 6 hours

Information from the Geological Survey of Alabama shows that geology that is conducive to sinkholes and other forms of land subsidence are potentially widespread across Pike County. Due to the lack of substantive documentation of previous events, it is assumed that land subsidence events may occur at most locations within the planning area, all existing and future buildings, facilities, and the general population in Pike County is considered to be vulnerable to this hazard and its impacts. With little recorded activity and documentation, it is believed that any potential losses in the planning area would be minor and localized in scope.

## WILDFIRE

According to the Risk Impact Assessment, the wildfire hazard scored a value of 2.3 (from a scale of 0 to 4).

**Table A.4.23: Risk Impact Assessment for Wildfires**

Probability	High
Impact	Minor
Location Extent	Negligible
Warning Time	Less than 6 hours
Duration	Less than one week

The effects caused by wildfires primarily will damage timber land in Pike County. If factors such as winds and drought are present, wildfires may spread from forested areas to areas with residential structures. These fires may begin due to events, such as arson or lightning, and are often difficult to contain due to the lack of access to the fire and a lack of readily available water to control the fires and the rapid spread of these fires. In the event of wildfires, structures in less populated areas in the proximity of the forested areas could be at risk of fire damage. Though all of Pike County's residents are at least somewhat vulnerable to wildfires, areas in isolated unincorporated areas are at a higher vulnerability.

Though several wildfires occur annually in Pike County, most are very small and only affect small forested areas. There have been no recorded incidents in the NCDC database, and there is no source that provides damage estimates for the wildfire occurrences in the planning area. It is assumed that a particular wildfire incident could create significant impact in the planning area if conditions were met, but overall wildfire damages over a long period of time are fairly minimal.

## WINTER STORM

According to the Risk Impact Assessment, the winter storm hazard scored a value of 2.4 (from a scale of 0 to 4).

**Table A.4.24: Risk Impact Assessment for Winter Storms**

Probability	Low
Impact	Limited
Location Extent	Large
Warning Time	More than 24 hours
Duration	Less than one week

Historical records show Pike County has occasional instances of winter weather, which is primarily through frozen precipitation (snow/ice) that only affects the area for a few days at the most.

Because winter weather events may occur at any location within Pike County, all existing and future buildings, facilities, and the general population in the planning area are considered to be vulnerable to this hazard and its impacts. Winter weather events will affect those in vulnerable housing more severely than other areas.

## **Section A.5 – Mitigation Strategy**

This Mitigation Strategy section of the Plan addresses requirements of Section 201.6(c)(3) through providing the blueprint for participating jurisdictions in Pike County to practice in order to become less vulnerable to the identified hazards in the Risk Assessment.

### **Section Contents**

- A.5.1 Mitigation Planning Process
- A.5.2 Mitigation Goals
- A.5.3 Mitigation Strategies
- A.5.4 Capabilities Assessment for Local Jurisdictions
- A.5.5 Jurisdictional Mitigation Action Plans
  - 1. Pike County Mitigation Actions
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  - 5. Town of Goshen Jurisdictions Actions
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  - 7. Troy City Schools Jurisdictions Actions

### **A.5.1 Mitigation Planning Process**

Local planning stakeholders were asked to review the progress of their previously adopted mitigation goals and to reevaluate those strategies based on updated information from the Risk Assessment and vulnerability to each profiled hazard. The goals and strategies were viewed in light of the impact and extent of hazard occurrences in local jurisdictions and the county as a whole.

### **A.5.2 Mitigation Goals**

Mitigation goals are broad statements that focus on long-term visions to reduce or avoid vulnerabilities to identified hazards within the county. Through the planning process, six primary goals were developed from corresponding goals in the Southeast Alabama Regional Multi-Jurisdiction Hazard Mitigation Plan. The mitigation goals expected to be achieved by development, adoption, and continuation of this plan include:

1. Manage the development of land and buildings to minimize risk of life and property loss due to hazard events (PREVENTION).
2. Protect structures and their occupants and contents from the damaging effects of hazard events (PROPERTY PROTECTION).
3. Preserve, rehabilitate, and enhance the beneficial functions of the natural environment to promote a balance between natural systems and social and economic demands (NATURAL RESOURCE PROTECTION).
4. Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where those modifications are feasible and environmentally suitable (STRUCTURAL MITIGATION).
5. Improve the efficiency, timing, and effectiveness of response and recovery efforts for hazard events (EMERGENCY SERVICES).
6. Educate and foster public awareness of hazards and techniques available for mitigation (PUBLIC EDUCATION AND AWARENESS).

### **A.5.3 Mitigation Strategies**

Mitigation strategies are broad, yet more defined actions that help to further define mitigation goals. A wide range of activities that are aligned with the six goal categorizations were considered in order to help achieve the established mitigation goals, in particular emphasizing mitigation concerning new and existing buildings and infrastructure. These strategies also provide additional background to addressing any specific hazard concerns. Land use planning capacity in much of the county is limited, due to the lack of land use planning and zoning authority in unincorporated areas, with the exception of floodplain management and subdivision regulations. Also, many small municipalities have limited planning and building enforcement function, due to fiscal constraints and lack of expertise, and choose not to implement land use, zoning, or code enforcement mechanisms. The six goal categorizations used for mitigation strategies include: Prevention, Property Protection, Natural Resource Protection, Structural Mitigation, Emergency Services, and Public Awareness and Education. These are discussed in detail below, as well as identifying appropriate hazard(s) that are mitigated through these approaches.

### **Goal #1: Prevention**

Prevention activities are primarily intended to address future development and to keep hazard effects from increasing. Prevention activities are often administered through government programs or regulatory actions that influence the built environment. These activities are particularly effective in hazard mitigation for areas with little current capital investment or development. Examples of prevention activities include:

1. Land use planning and zoning administration (All Hazards, primarily Flooding)
2. Building code enforcement program (Flooding, High Winds)
3. Open space preservation (Flooding)
4. Floodplain management regulations (Flooding)
5. Stormwater management regulations (Flooding)
6. Participation in National Flood Insurance Program (NFIP) (Flooding)
7. Capital improvements planning (All Hazards)

### **Goal #2: Property Protection**

Property protection activities primarily concentrate on the modification of existing buildings and adjacent areas to strengthen their ability to withstand hazard events, or to remove an at-risk structure from hazardous locations. Examples of property protection activities include:

1. Acquisition of floodprone properties (Flooding)
2. Relocation of floodprone structures (Flooding)
3. Elevation of floodprone structures (Flooding)
4. Retrofitting of critical facilities and other structures (All Hazards)

### **Goal #3: Natural Resource Protection**

Natural resource protection activities reduce the impact of hazard events by preserving, rehabilitating, or enhancing the natural environment and its protective functions. These activities would include areas such as floodplains, wetlands, and steep slopes. Examples of natural resource protection activities include:

1. Floodplain protection (Flooding)
2. Watershed management (Flooding)
3. Riparian buffers (Flooding)
4. Forest and vegetation management (Flooding, Wildfire)
5. Conservation easements (Flooding, Land Subsidence)

### **Goal #4: Structural Mitigation**

Structural mitigation protection activities are intended to lessen the impact of a hazard by utilizing construction of an appropriate structure. Examples of structural mitigation protection activities include:

1. Reservoirs (Flooding)
2. Levees and dams (Flooding)
3. Stormwater diversion (Flooding)
4. Retention and detention structures (Flooding)

5. Safe rooms and shelters (High Winds, Extreme Temperatures)

**Goal #5: Emergency Services**

Emergency services protection activities involve protecting people and property before, during, and after a hazard event. These activities assist in providing capable actions regarding hazard events. Examples of emergency services activities include:

1. Warning alert systems (All Hazards)
2. Continuity of operations (All Hazards)
3. Evacuation routes (All Hazards)
4. Emergency responder training (All Hazards)
5. Provision of alternative power (e.g. generators) (All Hazards)
6. Debris removal (All Hazards)

**Goal #6: Public Education and Awareness**

Public education and awareness activities inform and remind residents, business owners, elected officials, and other stakeholders about hazards, vulnerable locations, and mitigation actions that can be used to avoid losses. Examples of public education and awareness activities include:

1. Information dissemination, including maps and websites displaying hazard information (All Hazards)
2. Public exposition or workshops (All Hazards)
3. Educational programs (All Hazards)
4. Real estate disclosures (Dam Failure, Flooding, Technological Hazards)

#### **A.5.4 Capabilities Assessment for Local Jurisdictions**

A capability assessment examines the ability of each jurisdiction to implement a comprehensive mitigation strategy through examining existing programs, regulations, resources, and practices. This determination allows a jurisdiction to assess whether mitigation actions are feasible, due to financial resources, political climate, administrative capacity, and other jurisdictional capabilities.

Pike County is a part of the Alabama Emergency Management Agency (AEMA) Division B, which is a ten-county region composed of 70 municipalities with a myriad of governmental powers. The specific planning area for this particular Regional Hazard Mitigation Plan Annex is one county with four municipalities. Pike County is governed by an elected commission. All municipalities have a Mayor/Council form of government.

The mitigation strategies listed in Section A.5.3 above is framed by the capacity and capability of local jurisdictions to implement those particular actions through existing authorities, policies, programs, and resources. For most jurisdictions in Pike County, these are each very limited. Authority to control development through land use planning and zoning, a critical tool in hazard mitigation, is vested in municipalities that choose to exercise this practice. However, capacity is limited for enforcement due to local expertise, financial constraints, and public acceptance. The State of Alabama does not require a jurisdiction to implement land use planning and associated regulations. Therefore, most local jurisdictions avoid the practice of land use planning and zoning for general purposes and for hazard mitigation. In unincorporated areas within the county, this authority is absent except as it applies to flood control and public street and subdivision regulation. Flood control, more broadly, is authorized for each local jurisdiction to practice through a local ordinance regulating the placement and construction of new structures. Most municipalities and each county participate in the National Flood Insurance Program (NFIP) and maintain compliance with the applicable regulations (Table A.5.3). Likewise, the authority to enforce building codes is primarily restricted to municipalities and is only practiced by a limited number of these due to capacity constraints in the form of personnel, financial ability, and public acceptance.

Financial and technical capacity is limiting factors for mitigation project implementation in participating jurisdictions. The need for assistance in local planning and implementation is well established. Communities work together through the Pike County EMA and their regional commission (SCADC) to meet gaps in technical capacity related to planning for mitigation and to implement specific strategies. Authority over spending is vested in local elected or appointed boards and commissions. Primarily, the county commissions and local municipal councils have been the leaders in deciding which mitigation strategies are worthy of investment. Other eligible jurisdictions have traditionally channeled mitigation projects through these local governmental bodies for sponsoring. The use of federal and state grants is a prevalent feature of the financial strategy for mitigation projects involving new construction and major rehabilitation of public facilities or expenditures.

The capabilities of each participating jurisdiction are defined by the authorities, policies, programs, and resources that each utilizes in pursuit of hazard mitigation. Each jurisdiction falls into one of several categories, which possesses distinct authorities and resources to establish

hazard mitigation actions. For example, counties and municipalities differ in terms of statutory authority to pursue hazard mitigation. Meanwhile, two communities with the same authority may approach mitigation entirely differently in terms of the exercise of their authority. School and utility boards are subject to even greater restrictions on their authority.

The authorities and capabilities are summarized based on the powers granted by different units of government that participated in the planning process. County jurisdictions include: Pike County. Municipalities include: Banks, Brundidge, Goshen, and Troy. School Boards include: Pike County Schools and Troy City Schools.

Table A.5.1 below summarizes the statutory authority and resources of each jurisdiction and its present use or intended future use of these powers to implement potential actions and types of actions listed in the hazard mitigation plan. The table describes powers or policies that are granted to different types of jurisdictions in general terms, describes the jurisdictions that currently apply those policies in their mitigation efforts, describes the jurisdictions that intend to apply those authorities and policies for future implementation, and describes the means by which each jurisdiction will incorporate the mitigation action into its existing powers, authorities, policies, and capabilities. In every case, the primary means of incorporation involves review of proposed actions and implementation through the appropriate governmental authority such as the city council, county commission, school board, or utility board.

**Table A.5.1: Statutory Authority and Resources**

<b>Multi-Jurisdictional Hazard Mitigation Action Plan: Capability Assessment</b>	<b>Authorized for...</b>	<b>Practiced by...</b>	<b>Proposed for...</b>	<b>Incorporated through...</b>
Police power: ability to regulate activities of individuals in the jurisdiction for purposes of health, safety, and public welfare	Municipalities	All municipal jurisdictions	All municipal jurisdictions	Council action to enact and enforce regulations
Control of public expenditures: ability to acquire property and improve property owned by the jurisdiction; capacity to borrow and expend funds	Municipalities, Counties, School Boards	All jurisdictions	All jurisdictions	Action to approve expenditures by local county commission, city council, or school board
Building code enforcement: ability to enforce codes related to building materials and construction standards outside of flood hazard areas	Municipalities	Troy	Troy	Council action to enact and enforce regulations
Floodplain management authority: ability to regulate development in areas of special flood hazard in compliance with NFIP standards; includes authority to regulate land use and subdivisions inside of flood hazard areas	Municipalities, Counties	All participating NFIP jurisdictions	All participating NFIP jurisdictions	Council or Commission action to enact and enforce regulations
Purchase properties subject to flooding and maintain as permanent open space.	Municipalities, Counties, School Boards	All jurisdictions	All jurisdictions	Action to approve expenditures by local county commission, city council, or school board
Capital improvements: ability to plan and implement public infrastructure to mitigate hazards	Municipalities, Counties, School Boards	All jurisdictions	All jurisdictions	Action to approve expenditures by local county commission, city council, or school board
Zoning authority: ability to divide political jurisdiction into districts for purposes of regulating buildings and their use, both inside and outside of flood hazard areas	Municipalities	Troy	Troy	Council action to enact and enforce regulations
Subdivision regulations: ability to regulate new developments involving new parcels and infrastructure, both inside and outside of flood hazard areas	Municipalities, Counties	Troy, Pike County	Troy, Pike County	County Commission or Council action to enact and enforce regulations

Table A.5.2 below provides a summary of local plans, ordinances, and programs currently in place, or being developed within jurisdictions in Pike County. A “Yes” (Y) indicates the item is currently in place and being implemented. A “No” (N) indicates the items is not in place or being implemented. An asterisk (\*) indicates the item is currently being developed for future implementation.

**Table 5.2: Relevant Plans, Ordinances, and Programs**

<b>Jurisdiction</b>	<b>Zoning Ordinance</b>	<b>Code Enforcement</b>	<b>Recent Master Plan</b>	<b>Certified Floodplain Manager</b>	<b>NFIP Participation</b>
<b>Pike County</b>	N	N	N	N	Y
Town of Banks	N	N	N	N	N
City of Brundidge	N	N	Y	N	Y
Town of Goshen	N	N	N	N	Y
City of Troy	Y	Y	Y	N	Y

Table A.5.3 below summarizes NFIP participation and policy statistics for each jurisdiction in the planning area as of July 29, 2016. More site specific information on at-risk structures and repetitive loss properties is provided in Section A.4.8 in the Risk Assessment. Jurisdictions that are non-participating in the NFIP Program participated in the hazard mitigation planning process and have Mitigation Actions to address their status.

**Table 5.3: National Flood Insurance Program (NFIP) Status**

<b>Jurisdiction</b>	<b>Participation Status</b>	<b>Initial FBHM Identified</b>	<b>Initial FIRM Identified</b>	<b>Current Effective Map Date</b>
<b>Pike County</b>	Yes	06/18/76	08/01/87	12/02/11
Town of Banks	No	N/A	09/19/07	12/02/11
City of Brundidge	Yes	10/22/76	06/01/94	12/02/11
Town of Goshen	Yes	10/15/76	04/02/86	12/02/11
City of Troy	Yes	01/24/75	09/18/85	12/02/11

Source: NFIP Community Status Book (07/29/2016)

### A.5.5 Jurisdictional Mitigation Action Plans

This section identifies and analyzes a range of mitigation actions and projects under consideration to achieve the regional and local mitigation goals for reducing the effects of hazard events. Due to this particular update for Pike County and its jurisdictions being included as a Plan Annex into the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan, Pike County’s priorities have been adapted to align with the Regional Plan’s. However, the goals listed below are fundamentally consistent than the previously adopted hazard mitigation goals. The jurisdictional action plans also provide information on progress in local mitigation efforts since the last plan update. Local planning stakeholders thoroughly reviewed and considered the Risk Assessment and their local capabilities to determine the most appropriate plan of action for their jurisdictions. Each action or project listed has accessory information, such as designation of a lead agency, hazard(s) addressed, and potential funding source(s). The following table describes the key elements of the Mitigation Action Plans.

<b>Jurisdiction Name</b>	
Goal	Category of goal that is met: #1: Manage the development of land and buildings to minimize risk of life and property loss due to hazard events (PREVENTION) #2: Protect structures and their occupants and contents from the damaging effects of hazard events (PROPERTY PROTECTION) #3: Preserve, rehabilitate, and enhance the beneficial functions of the natural environment to promote a balance between natural systems and social and economic demands (NATURAL RESOURCE PROTECTION) #4: Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where those modifications are feasible and environmentally suitable (STRUCTURAL MITIGATION) #5: Improve the efficiency, timing, and effectiveness of response and recovery efforts for hazard events (EMERGENCY SERVICES) #6: Educate and foster public awareness of hazards and techniques available for mitigation (PUBLIC EDUCATION AND AWARENESS)
Action Description	Title and description of action to be undertaken
Hazards Addressed	Hazard which the action addresses
Lead Agency	Entity responsible for undertaking the action
Funding Source	Level of funding required for action, where applicable
Priority/Status	Categorization based on the following projected criteria: Completed: Notable mitigation projects implemented in the past five years Ongoing: Action in progress / perennial occurrence High: Projected implementation within five years Medium: Projected implementation between five and ten years Low: Projected implementation beyond ten years

Benefit/Cost Score	<p>The Benefit/Cost score included in the jurisdictional Mitigation Action Plans are considered at the planning level and does not include a full analysis of all costs and benefits associated with action implementation. For example, a mitigation action that scores “High” in benefits and “Low” in costs will be listed as “Moderate” in the plan due to providing a long-term solution, but with a high implementation cost. For some projects, such as routine or ongoing operations conducted with local operating funds and existing staff, this may be the only explicit comparison of costs and benefits. For projects of which grant funding or bond issues may be sought, more in-depth evaluations of costs and benefits may be required. As specific project scopes are detailed, the benefits and costs of an action can be identified with more precision and the benefit-cost ratio (BCR) that results from a full benefit-cost analysis may differ from the planning level Benefit/Cost score presented in the plan. It should be noted that higher scores do not necessarily correspond to high priorities, nor do low scores correspond to low priority projects. An important action with a high priority to a jurisdiction may have a lower Benefit/Cost score because of its complexity, assumed high expense, and other potential costs. Jurisdictions should not be discouraged or deterred from further consideration of actions which have low scores until additional, more specific, evaluations of the costs and benefits has been undertaken.</p> <p><b><u>Low</u></b>: Benefits: Projects that only benefit a limited population, or provides short-term benefits / Costs: projects likely to cost over \$100,000 and requiring additional funding or staffing outside of normal operations, and is complicated to implement.</p> <p><b><u>Moderate</u></b>: Benefits: Projects that would be felt by moderate amount of population in jurisdiction, or solves a problem for several years / Costs: projects that may need additional funding or continued study or staffing outside of normal operations, with estimated costs between \$10,000 and \$100,000.</p> <p><b><u>High</u></b>: Benefits: Projects that benefit many in the jurisdiction that are long-term solutions / Costs: projects that can be implemented by existing personnel with little additional burden on budget and uncomplicated to implement.</p>
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### Pike County Mitigation Action Plan

Goal	Action Description	Hazards Addressed	Lead Agency	Funding Source	Priority / Status	Benefit / Cost Score
1,3	Continue participation in the NFIP through maintaining and administering the county's floodplain development regulations, enforcing subdivision regulations that minimize flood risk to new developments, participating in flood map updates, and providing flood risk information to the public	Flooding	NFIP Coordinator / Local Government Administration	HMGP/FMA/Local	High	High
5	Installation of emergency generator for Trojan Arena, used as a public shelter during disaster events	High Winds	Troy University	Troy University	Completed	N/A
5	Maintain membership in the Alabama Mutual Aid System	All	Pike County EMA	Local/EMPG	Ongoing	High
5	Review the legal basis for the existing mutual aid compact to ensure that loaning/borrowing equipment and payment for supplies and services can be properly executed and transacted under the Code of Alabama and any related regulations	All	Pike County EMA / County Commission	Local	Ongoing	High
1	Regularly gather data and determine needed revisions to accurately reflect local hazard events and impacts to Risk and Vulnerability assessment	All	Pike County EMA	HMGP/Local	Ongoing	High
1	Establish informal contacts to request data between various agencies. In the event an external organization requires more formal arrangements, a Memorandum of Understanding between the respective organizations will be considered	All	Pike County EMA	Local	Ongoing	High
1	Maintain and review the local elements of the hazard mitigation plan as required by the Plan Maintenance section	All	Pike County EMA / LEPC	Local	Ongoing	High

1	Review status of related programs and determine if they are currently active or an anticipated update is needed	All	Pike County EMA	Local	Ongoing	High
1,5	Establish shared database where merchants can post locally available equipment and material. Conduct a feasibility study including the network design and procedures	All	Pike County EMA	Local	Ongoing	High
5	Disperse equipment and supplies to pre-designated locations when winter storm warnings or advisories are issued	Winter Storm	Pike County EMA	Local	Ongoing	High
4	Assess highly populated facilities to determine how they can be retrofitted to withstand high wind events	High Winds	Pike County EMA / Pike County Engineer	Local	Ongoing	Moderate
6	Circulate information regarding drought status to local governments, local utilities, and other interested agencies	Drought / Extreme Heat	Pike County EMA	Local	Ongoing	High
1	Participate in the Drought Response as applicable during a Drought Declaration	Drought / Extreme Heat	Pike County EMA	Local	Ongoing	High
2	Maintain the warning siren network through testing and upgrading equipment, as needed	All	Pike County EMA	Local	Ongoing	High
5	Procurement of emergency generators for critical facilities	All	Pike County EMA	HMGP/Local	High	Moderate
4	Facilitate the installation of community safe rooms in needed areas	High Winds	Pike County EMA	HMGP/Local	High	Moderate
4	Facilitate the installation of individual safe rooms	High Winds	Pike County EMA	HMGP/Local/Private	High	High
1,6	Distribution of weather alert radios to citizens	All	Pike County EMA	Local/Private	High	High
5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High

**Pike County Schools Mitigation Action Plan**

<b>Goal</b>	<b>Action Description</b>	<b>Hazards Addressed</b>	<b>Lead Agency</b>	<b>Funding Source</b>	<b>Priority / Status</b>	<b>Benefit / Cost Score</b>
4	Provide safe rooms or shelter spaces in school facilities for student and staff safety	High Winds	Pike County Schools	HMGP/Pike Co Schools	High	Moderate
5	Procure and maintain generators for critical facilities	All	Pike County Schools	HMGP/Pike Co Schools	High	Moderate
5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High

### Town of Banks Mitigation Action Plan

Goal	Action Description	Hazards Addressed	Lead Agency	Funding Source	Priority / Status	Benefit / Cost Score
4	Installation of one individual safe room	High Winds	Pike County EMA	HMGP/Private	Completed	N/A
4	Facilitate the placement of additional safe rooms in community	High Winds	Pike County EMA	HMGP/Private	High	High
4	Construction of community safe rooms in critical locations	High Winds	Pike County EMA	HMGP/Local	High	Moderate
4	Assess public facilities to determine how they can be retrofitted to withstand high wind events.	High Winds	Pike County EMA/Town Administration	Local	High	Moderate
1,3	Adopt floodplain management regulations to meet NFIP requirements for reducing flood hazards	Flooding	Town Administration/NFIP Coordinator	Local	Medium	High
5	Procure and maintain generators for critical facilities	All	Town Administration/Pike County EMA	HMGP/Local	High	Moderate
2	Maintain the warning siren network through testing and upgrading equipment, as needed.	All	Pike County EMA	Local	Ongoing	High
1,6	Distribution of weather alert radios to citizens	All	Pike County EMA	Local/Private	High	High
5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High

### City of Brundidge Mitigation Action Plan

Goal	Action Description	Hazards Addressed	Lead Agency	Funding Source	Priority / Status	Benefit / Cost Score
4	Installation of three individual safe rooms	High Winds	Pike County EMA	HMGP/Private	Completed	N/A
1,3	Continue participation in the NFIP through maintaining and administering the county's floodplain development regulations, enforcing subdivision regulations that minimize flood risk to new developments, participating in flood map updates, and providing flood risk information to the public.	Flooding	City Administration/NFIP Coordinator	HMGP/FMA/Local	Ongoing	High
4	Facilitate the placement of additional safe rooms in community	High Winds	Pike County EMA	HMGP/Private	High	High
4	Construction of community safe rooms in critical locations	High Winds	Pike County EMA	HMGP/Local	High	Moderate
4	Assess public facilities to determine how they can be retrofitted to withstand high wind events.	High Winds	Pike County EMA/City Administration	Local	High	Moderate
5	Procure and maintain generators for critical facilities	All	City Administration/Pike County EMA	HMGP/Local	High	Moderate
2	Maintain the warning siren network through testing and upgrading equipment, as needed.	All	Pike County EMA	Local	Ongoing	High
1,6	Distribution of weather alert radios to citizens	All	Pike County EMA	Local/Private	High	High
5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High

### Town of Goshen Mitigation Action Plan

Goal	Action Description	Hazards Addressed	Lead Agency	Funding Source	Priority / Status	Benefit / Cost Score
4	Installation of five individual safe rooms	High Winds	Pike County EMA	HMGP/Private	Completed	N/A
1,3	Continue participation in the NFIP through maintaining and administering the county's floodplain development regulations, enforcing subdivision regulations that minimize flood risk to new developments, participating in flood map updates, and providing flood risk information to the public.	Flooding	Town Administration/NFIP Coordinator	HMGP/FMA/Local	Ongoing	High
4	Facilitate the placement of additional safe rooms in community	High Winds	Pike County EMA	HMGP/Private	High	High
4	Construction of community safe rooms in critical locations	High Winds	Town Administration/Pike County EMA	ADECA/HMGP/Local	High	Moderate
4	Assess public facilities to determine how they can be retrofitted to withstand high wind events.	High Winds	Pike County EMA/Town Administration	Local	High	Moderate
5	Procure and maintain generators for critical facilities	All	Town Administration/Pike County EMA	HMGP/Local	High	Moderate
2	Maintain the warning siren network through testing and upgrading equipment, as needed.	All	Pike County EMA	Local	Ongoing	High
1,6	Distribution of weather alert radios to citizens	All	Pike County EMA	Local/Private	High	High
5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High

### City of Troy Mitigation Action Plan

Goal	Action Description	Hazards Addressed	Lead Agency	Funding Source	Priority / Status	Benefit / Cost Score
4	Installation of seven individual safe rooms	High Winds	Pike County EMA	HMGP/Private	Completed	N/A
5	Installation of emergency generator at Troy Regional Medical Center	All	Troy Regional Medical Center	Private	Completed	N/A
1,3	Continue participation in the NFIP through maintaining and administering the county's floodplain development regulations, enforcing subdivision regulations that minimize flood risk to new developments, participating in flood map updates, and providing flood risk information to the public.	Flooding	City Administration/NFIP Coordinator	HMGP/FMA/Local	Ongoing	High
5	Through partnership with Troy City Schools, placement of new fire station on Elba Highway to serve areas west of US Hwy 231	All	City Administration	Local	Ongoing	High
5	Completion of Enzor Road Connector Project that will provide additional emergency accessibility to southeastern areas of Troy	All	City Administration	Local	Ongoing	Moderate
4	Facilitate the placement of additional safe rooms in community	High Winds	Pike County EMA	HMGP/Private	High	High
4	Construction of community safe rooms in critical locations	High Winds	Pike County EMA/City Administration	HMGP/Local	High	Moderate
4	Assess public facilities to determine how they can be retrofitted to withstand high wind events.	High Winds	Pike County EMA/City Administration	Local	High	Moderate
5	Procure and maintain generators for critical facilities	All	City Administration/Pike County EMA	HMGP/Local	High	Moderate
2	Maintain the warning siren network through testing and upgrading equipment, as needed.	All	Pike County EMA	Local	Ongoing	High
1,6	Distribution of weather alert radios to citizens	All	Pike County EMA	Local/Private	High	High

5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High
5	Develop of new communications tower to facilitate emergency communications between multiple agencies and jurisdictions	All	Pike County EMA/Pike County LEPC	Federal/Local	High	Moderate
5	Procurement of trailer for efficient transport of HazMat equipment to disasters	All	Troy Fire Department	Federal/Local	High	High

### Troy City Schools Mitigation Action Plan

Goal	Action Description	Hazards Addressed	Lead Agency	Funding Source	Priority / Status	Benefit / Cost Score
4	Provide safe rooms or shelter spaces in school facilities for student and staff safety	High Winds	Troy City Schools	HMGP/Troy City Schools	High	Moderate
5	Procure and maintain generators for critical facilities	All	Troy City Schools	HMGP/Troy City Schools	High	Moderate
5	Placement of B-Con (Bleeding Control) stations in public buildings	All	Pike County EMA	DHS/Local	High	High
5	Acquisition of barricades and other traffic control devices for post-disaster management	All	Pike County EMA	DHS/Local	High	High

## **Section A.6 - Plan Maintenance Process**

This section of the plan addressed requirements of Interim Final Rule (IFR) Section 201.6(c)(4).

### **Section Contents**

- A.6.1 Hazard Mitigation Plan Monitoring, Evaluation, and Update Process
- A.6.2 Hazard Mitigation Plan Incorporation
- A.6.3 Public Awareness/Participation

### **A.6.1 Hazard Mitigation Plan Monitoring, Evaluation, and Update Process**

Pike County and its participating jurisdictions will follow the monitoring, evaluation, and update process stated in the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan, as follows. The Southeast Alabama Regional Planning and Development Commission (SEARP&DC) will facilitate plan maintenance activities with assistance from the AEMA Division B Regional Coordinator, local EMA directors, and the South Central Alabama Development Commission (SCADC) through the five-year framework of the Hazard Mitigation Plan. Local EMA directors will serve as a liaison to participating jurisdictions within their respective counties through their local processes, such as Local Emergency Planning Committee (LEPC) or similar stakeholder groups. The plan monitoring and review process shall be chaired by the elected AAEM representative from AEMA Division B. Election of an AAEM representative occurs every summer on an annual basis. Periodic review and revision of the Hazard Mitigation Plan is important to ensure the plan's currency and compliance with applicable regulations and to assess the progress of local mitigation actions. Review and revision of the Hazard Mitigation Plan may occur through the following two procedures:

#### **Annual Review Process**

On at least an annual basis, each participating county EMA official shall facilitate a meeting in their respective county and include local jurisdictions and other stakeholders, such as the Local Emergency Planning Committee. The exact meeting process in each participating county will be slightly different. At a minimum, the scope of the annual county-level plan review meeting will be to review and evaluate completed mitigation actions for effectiveness, review status of high-priority or ongoing mitigation actions, discuss possible changes to hazard vulnerability or other elements of the risk assessment, assess any major land use changes, and discuss any other relevant issue pertaining to the Hazard Mitigation Plan. The general public will be invited to attend this meeting through public outreach, as further described in Section A.6.3 below, and encouraged to provide their input into the annual review.

Subsequently, a regional meeting between SEARP&DC, local EMA officials, AEMA Division B Coordinator, and regional stakeholders will be held to review information collected at the county-level meetings and revise the plan. It is viewed appropriate by the local EMA directors that this meeting shall normally coincide with an AEMA Division B quarterly meeting. Any major revision made to the Hazard Mitigation Plan that affects the region as a whole will be distributed to all jurisdictions for adoption in a public session. Otherwise, any project added to a specific Jurisdictional Mitigation Action Plan will be adopted by that specific jurisdiction in a public session.

#### **Emergency Review Process**

In certain instances, such as a disaster occurrence impacting a participating jurisdiction, the full Annual Review Process may not be timely enough to address unforeseen issues created by a particular event. In these situations, a county EMA official may facilitate a county-level plan review meeting, similar to the process described above in the Annual Review Process, with the requisite public outreach. Once this meeting is completed, a local amendment may be adopted by a participating jurisdiction that only pertains to the revision of their specific Jurisdictional Mitigation Action Plan in a public session. After any local amendment, the local county EMA

official shall submit documentation of the local amendment to the Chair of the plan monitoring and review process.

### **Five-Year Plan Update**

Before the five-year expiration of the Hazard Mitigation Plan, a thorough review, beginning approximately 18 months prior to plan expiration, shall be held to determine any significant changes in the AEMA Division B planning area that may affect the region's vulnerability to hazard impacts, and an evaluation of the mitigation strategy and jurisdictional mitigation action plans developed as part of this process. The AEMA Division B counties not fully inserted into this plan will be approached about possible inclusion in future plan updates. This plan update shall incorporate any changes to federal or state regulations that may affect the Hazard Mitigation Plan contents. The plan update process will follow a locally-driven, public process, similar to the plan review processes outlined above.

In addition, multiple state, regional, and local partners will be consulted to provide data or consultation in plan formation. Consulting entities will include: the U.S. Army Corps of Engineers, PowerSouth Electrical Cooperative, Alabama Forestry Commission, Geological Survey of Alabama (GSA), Alabama Department of Public Health (ADPH), Alabama Department of Transportation (ALDOT), Alabama Department of Environmental Management (ADEM), Alabama Historical Commission (AHC), neighboring county EMA offices, regional academic providers, and private sector entities, such as local chambers of commerce and the American Red Cross. Upon completion of this review and update, the updated Hazard Mitigation Plan will be submitted to the AEMA and FEMA for review and approval.

### **A.6.2 Hazard Mitigation Plan Incorporation**

Pike County and its participating jurisdictions will follow the plan incorporation process stated in the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan, as follows. Once the Regional Hazard Mitigation Plan is "approvable upon adoption" by FEMA, each jurisdiction shall proceed with adoption procedures. Each proposed action listed in the jurisdictional mitigation action plans are assigned to one or multiple lead agencies or departments in order to assign responsibility and accountability of action implementation to specific sources. In addition to the assigned local agency or department, each mitigation action plan also has a priority or status assigned that roughly coincides with an implementation timeline. The local jurisdictions in AEMA Division B will work to seek to provide operational funding to actions that are ongoing and seek outside funding for capital projects that are outside the realm of normal funding during both pre-disaster and post-disaster periods.

The participating jurisdictions will integrate this Hazard Mitigation Plan into appropriate and relevant municipal and county government decision-making processes, where feasible. This includes integrating the findings of the Hazard Mitigation Plan into documents, such as comprehensive or master plans, future land use plans, subdivision regulations, building regulations, capital improvement plans, or similar mechanisms. Local EMA officials or planning staffs of the appropriate regional planning council will provide technical assistance for incorporation, upon request. The participating jurisdictions will also work to ensure the goals and actions of local planning documents are consistent with the goals and mitigation actions of the Hazard Mitigation Plan, and will not introduce additional hazard vulnerabilities to the local

area and region at-large. Local EMA directors will incorporate applicable information from this Hazard Mitigation Plan into other required emergency management plans, including each county's Emergency Operations Plan and county THIRAs. During county-level plan reviews, participating communities will be asked to record the planning documents in which elements of the Hazard Mitigation Plan were incorporated.

The Hazard Mitigation Plan will also be provided to the Southeast Alabama Regional Planning and Development Commission (SEARP&DC) and the South Central Alabama Development Commission (SCADC) for consistency with other regional planning and economic development activities, as well as local economic development councils.

### **A.6.3 Public Awareness/Participation**

Pike County and its participating jurisdictions will follow the public awareness and participation process stated in the Southeast Alabama Regional Multi-Jurisdictional Hazard Mitigation Plan, as follows. Public participation in the hazard mitigation planning process, including monitoring and review of the existing plan, and development and adoption of future plans, is a very important component. Though concerted efforts were made to engage the general public in the hazard mitigation planning process through multiple county-level meetings that were advertised through several methods, there were very few unaffiliated members of the public that participated. Efforts will increase to involve local and state government agencies, businesses, academia, and the general public in the ongoing mitigation planning process to the maximum extent possible.

As described in the Monitoring, Evaluation, and Update process, any significant changes, amendments, or updates to the Hazard Mitigation Plan shall be discussed in open meetings prior to any adoption procedures. Any plan updates or major revisions will be adopted during a public session. The public will be informed of public hearings and other Hazard Mitigation related meetings through a variety of media sources, including but not limited to: local newspaper advertisements and notices, radio advertising, postings at high traffic community areas (e.g. libraries and government buildings), booths at local Severe Weather Expo events, social media such as local Facebook pages, telephone messages, and various websites such as local EMA offices, SEARP&DC, and Open Meetings websites. SEARP&DC and local EMA offices will keep public copies and provide copies of the Hazard Mitigation Plan to each County Commission office, seats of government in each municipality, and other appropriate public locations. SEARP&DC will post a copy of the Hazard Mitigation Plan on the Data Center portion of its website. Press releases will be published via various media to inform the general public and stakeholders that the Hazard Mitigation Plan is available for review, where to find the Hazard Mitigation Plan, and how they can play a role in its creation and future revisions.