



# Boyle County/Cities of Danville, Junction City, & Perryville Natural Hazard Mitigation Plan

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## **Identifying Hazards**

The Boyle County area is vulnerable to a wide variety of natural hazards that threaten life and property. These natural hazards include:

- Floods
- Earthquakes
- Tornadoes
- Winter Storms
- Karst (Sinkholes)
- Dam Failure
- Drought

The Boyle County Hazard Mitigation Plan Development Team identified these hazards based on the historical evidence gathered from the Kentucky State Climatology Center, the National Climatic Data Center, FEMA's Hazard Mapping website, and the Kentucky Geological Survey.

The appendices contain maps utilized by the Boyle County HMPDT in identifying and profiling potential hazards for the Boyle County planning area.

## **Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team was initiated to develop a hazard mitigation plan for the county and its jurisdictions. Committee members include or represent the county judge-executive, mayors, emergency management, city and county fire departments, the health department, and others. The committee looked at data regarding each individual hazard gathered and provided by staff of the Bluegrass Area Development District (BGADD). ADD staff also developed a risk assessment for each individual hazard.

Utilizing background hazard information and hazard historical data, the committee responded with overall goals and objectives relative to the hazard. Upon identification of these goals and objectives, the committee looked at specific measures aimed at fulfilling these goals and meeting stated objectives. Various methods are used to identify desirable hazard mitigation projects such as proven success in other jurisdictions, consultation with mitigation experts, and suggestions from ADD staff. After inclusion of projects in the plan, review and approval of the overall plan is required at the local, regional, and state levels in addition to review and acceptance by FEMA. Implementation of any mitigation projects will be dealt with when the necessity arises.

## **Implementation of Mitigation Measures**

Prioritization will be based on the following: 1.) Critical need, 2.) Availability of funds, and/or 3.) Schedule of project (e.g., 0-2 years, 3-10 years, or 11-20 years). Projects *should* be, but are not limited to being prioritized based on a cost benefit review, environmental soundness, and/or technical feasibility. Implementation will be done through the cooperation of agencies both within Boyle County and the cities of Danville, Junction City, and Perryville. Funds *should* be continuously sought out from various sources, and resources (i.e. human, technical, and logistical) will be used for implementation of these projects, given the decision is made to follow through with construction or implementation. With respect to implementation, projects should be administered by the agency that has applied for the funds needed to complete the desired mitigation task or project. However, Boyle County officials have the authority to establish administration guidelines, timetables, and funding allocations with respect to mitigation project implementation. Implementation efforts are based on project/action plans drafted by the Bluegrass ADD derived from the input of subcommittees and the Boyle County Hazard Mitigation Plan Development Team.

## **Plan Maintenance Procedures**

The hazard mitigation plan requires a plan maintenance process. The following sections address how the Boyle County Natural Hazard Mitigation Plan will be updated and maintained as necessary.

### **Monitoring, Evaluating, and Updating the Plan**

In order to provide monitoring, evaluation, and updates to the mitigation plan every five years, Boyle County and its jurisdictions will use their emergency management personnel as the primary source for review and maintenance of the hazard mitigation plan. The document will be reviewed and amended as necessary at least once every five years or more often if necessary. The use of outside help, such as support from the Bluegrass Area Development District will be procured as needed.

### **Implementation Through Existing Programs**

Boyle County and the cities of Danville, Junction City, and Perryville *should* incorporate mitigation plan goals and objectives, as well as mitigation actions/projects into a program currently used (i.e. comprehensive plans, transportation plans, emergency response plans, etc.) as is feasible and practical. This ensures a cooperative venture, with respect to planning, when and if the decision is made to construct or implement a particular mitigation project at a later date. This also provides a broader range of funding sources to seek out when appropriate.

### **Continued Public Involvement**

The Boyle County Hazard Mitigation Plan Development Team and Bluegrass Regional Hazard Mitigation Planning Committee have set out the following procedures for inclusion of public participation in the mitigation plan maintenance process. When updates are required, whether by five-year cycle or extenuating circumstances, public input will be solicited primarily via a public notice. A committee (to be chosen at a later date) will review public input once it is received by a set deadline. Upon review by the committee, which will include a vote to determine relevance of public comments, public input will be considered on a case-by-case basis for inclusion in any updates to the hazard mitigation plan.

# Floods

## **Floods**

### **Mitigation Goals & Objectives**

The following goals are identified for Boyle County and the cities of Danville, Junction City, and Perryville based upon the risk assessment for the hazard of floods.

Goal 1: To lessen the number of injuries and deaths caused by floods.

Objective A: Keep people away from areas susceptible to flooding.

Goal 2: To lessen the financial costs due to damage from flooding.

Objective A: Reinforce structures and properties in areas prone to floods.

Goal 3: To lessen the amount of property loss and damage from flooding regardless of cost.

Objective A: Move properties from flood prone areas and enact restrictions on future construction.

Objective B: Through Planning and Zoning guidelines, ensure that new buildings not be built in flood-prone areas.

### **Multi-Jurisdictional Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team, based on the risk assessment for the hazard of flooding and in line with the stated goals and objectives that were previously noted, derived a number of projects, which are detailed in this section. These projects were developed based on information presented to the planning committee by Bluegrass ADD staff. Projects range from education to structural projects to expansion of existing projects intended to mitigate against flooding. Consideration (to the greatest extent possible) has been given to feasibility, acceptability, cost effectiveness, and environmental soundness.

The Boyle County Hazard Mitigation Plan Development Team proposes the following project for the following hazard.

Hazard—Floods

- Devise a house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following project for the following hazard.

Hazard—Floods

- Devise a house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following project for the following hazard.

Hazard—Floods

- Devise a house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazards.

Hazard—Floods

- Elevation of critical facilities
- Retrofitting of critical facilities
- Devise a house identification system to expedite the arrival of emergency personnel in times of hazard

**Table of Mitigation Projects/Actions for Boyle County and the Cities of Danville, Junction City, and Perryville**

Hazard—Floods

Project \ Jurisdiction	County of Boyle	City of Danville	City of Junction City	City of Perryville
Elevate structures				X
Retrofit structures				X
Implement house identification system	X	X	X	X

# Earthquakes

## Earthquakes

### **Mitigation Goals & Objectives**

Goal 1: To lessen the number of injuries and deaths caused by earthquakes.

Objective A: Keep people away from areas susceptible to earthquake damage.

Objective B: Incorporate usage of siren alert system for notification during earthquakes.

Goal 2: To lessen the financial costs due to damage from earthquakes.

Objective A: Retrofit (or reinforce) structures and properties prone to earthquake damage.

Goal 3: To lessen the amount of property loss and/or damage from earthquakes.

Objective A: Determine stipulations and enact restrictions on future construction.

Objective B: Through Planning and Zoning guidelines, assure that new buildings be built in accordance with earthquake mitigation standards and provisions.

### **Multi-Jurisdictional Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team proposes the following projects for the following hazard.

Hazard—Earthquakes

- Supplement current educational practices
- Seek funding for additional sirens
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following projects for the following hazard.

Hazard—Earthquakes

- Supplement current educational practices
- Seek funding for additional sirens
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following projects for the following hazard.

Hazard—Earthquakes

- Supplement current educational practices
- Seek funding for additional sirens
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazard.

Hazard—Earthquakes

- Supplement current educational practices
- Seek funding for additional sirens
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

**Table of Mitigation Actions/Projects for Boyle County and the Cities of Danville,  
Junction City, and Perryville**

Hazard—Earthquakes

Jurisdiction Project	County of Boyle	City of Danville	City of Junction City	City of Perryville
Supplement current educational practices	X	X	X	X
Seek funding for sirens	X	X	X	X
Implement house identification system	X	X	X	X

Tornadoes /  
Severe  
Thunderstorms

## Tornadoes

### **Mitigation Goals & Objectives**

The following goals are identified for Boyle County and the cities of Danville, Junction City and Perryville based upon the risk assessment for tornadoes.

Goal 1: To lessen the number of injuries and deaths caused by tornadoes.

Objective A: Keep people away from areas susceptible to tornado damage.

Objective B: Incorporate usage of siren alert system for notification of tornadoes.

Goal 2: To lessen the financial costs due to damage from tornadoes.

Objective A: Retrofit (or reinforce) structures and properties prone to tornado damage.

Goal 3: To lessen the amount of property loss and/or damage from tornadoes.

Objective A: Determine stipulations and enact restrictions on future construction.

Objective B: Through Planning and Zoning guidelines, assure that new buildings be built in accordance with tornado mitigation standards and provisions.

### **Multi-Jurisdictional Tornado Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team proposes the following projects for the following hazard.

Hazard—Tornadoes

- Seek funding for additional warning sirens
- Placement of alert radios in schools, nursing homes, hospitals, etc.
- Construction of tornado shelters for mobile home concentrations
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following projects for the following hazard.

Hazard—Tornadoes

- Seek funding for additional sirens
- Placement of alert radios in schools, hospitals, nursing homes, etc.
- Construction of tornado shelters
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following projects for the following hazard.

Hazard—Tornadoes

- Seek funding for additional sirens
- Placement of alert radios in schools
- Construction of tornado shelters
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazard.

Hazard—Tornadoes

- Seek funding for additional sirens
- Construction of tornado shelters
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

**Table of Mitigation Projects/Actions for Boyle County and the Cities of Danville,  
Junction City, and Perryville**

Hazard—Tornadoes

Project \ Jurisdiction	County of Boyle	City of Danville	City of Junction City	City of Perryville
Warning sirens	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Alert radios	<b>X</b>	<b>X</b>	<b>X</b>	
Tornado shelters	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Implement house identification system	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

# Severe Winter Storms

## Winter Storms

Goal 1: To lessen the number of injuries and deaths caused by winter storms.

Objective A: Keep people away from areas susceptible to winter storm damage.

Goal 2: To lessen the financial costs due to damage from winter storms.

Objective A: Retrofit (or reinforce) structures and properties prone to winter storm damage.

Goal 3: To lessen the amount of property loss and/or damage from winter storms.

Objective A: Determine stipulations and enact restrictions on future construction.

Objective B: Through Planning and Zoning guidelines, assure that new buildings be built in accordance with winter storm mitigation standards and provisions.

### **Multi-Jurisdictional Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team proposes the following projects for the following hazard.

Hazard—Winter Storms

- Encourage better trimming of right of way
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following projects for the following hazard.

Hazard—Winter Storms

- Encourage better trimming of right of way
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following projects for the following hazard.

Hazard—Winter Storms

- Encourage better trimming of right of way
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazard.

Hazard—Winter Storms

- Encourage better trimming of right of way
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

**Table of Mitigation Projects/Actions for Boyle County and the Cities of Danville, Junction City, and Perryville**

Hazard—Winter Storms

Jurisdiction \ Project	County of Boyle	City of Danville	City of Junction City	City of Perryville
Trimming of right of way	X	X	X	X
Implement house identification system	X	X	X	X

# Sinkholes / Karst Geology

## Karst (Sinkholes)

### **Mitigation Goals & Objectives**

The following goals are identified for Boyle County and the cities of Danville, Junction City and Perryville based upon the risk assessment for karst.

Goal 1: To lessen the number of injuries and deaths caused by karst.

Objective A: Keep people away from areas susceptible to karst and sinkholes.

Goal 2: To lessen the amount of property loss and/or damage from karst.

Objective A: Protect structures located in karst areas.

Objective B: Prohibit buildings being constructed in areas susceptible to karst and sinkholes.

### **Multi-Jurisdictional Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team proposes the following projects for the following hazard.

Hazard—Karst

- Fence in areas of water and wastewater plants that are located near sinkholes
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following projects for the following hazard.

Hazard—Karst

- Fence in areas of water and wastewater plants that are located near sinkholes
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following projects for the following hazards.

Hazard—Karst

- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazards.

Hazard—Karst

- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

**Table of Mitigation Projects/Actions for Boyle County and the Cities of Danville, Junction City, and Perryville**

Hazard—Karst

Jurisdiction \ Project	County of Boyle	City of Danville	City of Junction City	City of Perryville
Fencing	X	X		
Implement housing identification system	X	X	X	X

# Dam & Levee Failure

## Dam Failure

### **Mitigation Goals & Objectives**

The following goals are identified for Boyle County and the cities of Danville, Junction City and Perryville based upon the risk assessment for dam failure.

Goal 1: To lessen the number of injuries and deaths caused by dam failure.

Objective A: Keep people away from areas susceptible to dam and levee failure.

Objective B: Ensure routine monitoring and maintenance of dam.

Goal 2: To lessen the amount of property loss and/or damage from dam failure.

Objective A: Ensure routine monitoring and maintenance of dam.

### **Multi-Jurisdictional Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team proposes the following projects for the following hazard.

Hazard—Dam Failure

- Work with the City of Perryville to plan an emergency notification strategy for the City of Perryville in the event of an emergency due to dam failure at Tank Pond
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following projects for the following hazard.

Hazard—Dam Failure

- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following projects for the following hazard.

Hazard—Dam Failure

- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazard.

Hazard—Dam Failure

- Work with Boyle County to plan an emergency notification strategy for the City of Perryville in the event of an emergency due to dam failure at Tank Pond
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

**Table of Mitigation Projects/Actions for Boyle County and the Cities of Danville, Junction City, and Perryville**

Hazard—Dam Failure

Jurisdiction \ Project	County of Boyle	City of Danville	City of Junction City	City of Perryville
Emergency notification strategy	X			X
Implement house identification system	X	X	X	X

# Severe Drought

## Drought

### **Mitigation Goals & Objectives**

The following goals are identified for Boyle County and the cities of Danville, Junction City and Perryville based upon the risk assessment for drought.

Goal 1: To lessen the number of injuries and deaths caused by drought.

Objective A: Maintain adequate water supply to individuals during times of drought, especially to vulnerable populations.

Goal 2: To lessen the amount of crop loss and/or damage due to drought.

Objective A: Maintain adequate water supply for area farms during times of drought conditions.

### **Multi-Jurisdictional Mitigation Strategy**

The Boyle County Hazard Mitigation Plan Development Team proposes the following projects for the following hazard.

#### Hazard—Drought

- Identify areas that do not have access to county/city water
- Set up procedure for getting water to residents without county/city water in times of drought
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Danville proposes the following projects for the following hazard.

#### Hazard—Drought

- Identify areas that do not have access to county/city water
- Set up procedure for getting water to residents without county/city water in times of drought
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Junction City proposes the following projects for the following hazard.

Hazard—Drought

- Identify areas that do not have access to county/city water
- Set up procedure for getting water to residents without county/city water in times of drought
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

The City of Perryville proposes the following projects for the following hazard.

Hazard—Drought

- Identify areas that do not have access to county/city water
- Set up procedure for getting water to residents without county/city water in times of drought
- Devise house identification system to expedite the arrival of emergency personnel in times of hazard

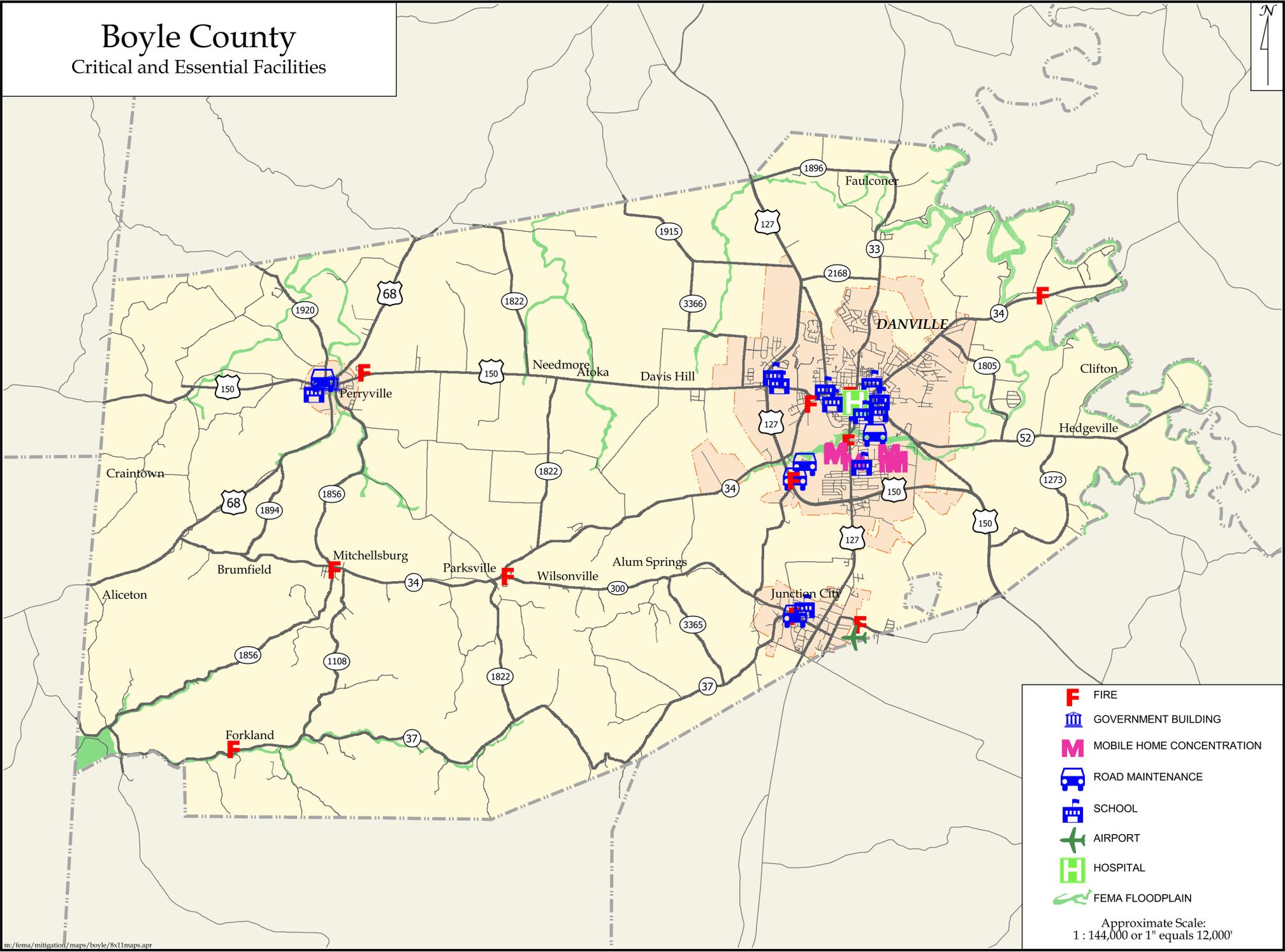
**Table of Mitigation Projects/Actions for Boyle County and the Cities of Danville, Junction City, and Perryville**

Hazard—Drought

Jurisdiction \ Project	County of Boyle	City of Danville	City of Junction City	City of Perryville
Identification of areas without access to water	X	X	X	X
Set up procedure to get water to residents without water	X	X	X	X
Implement house identification system	X	X	X	X

# Boyle County

## Critical and Essential Facilities

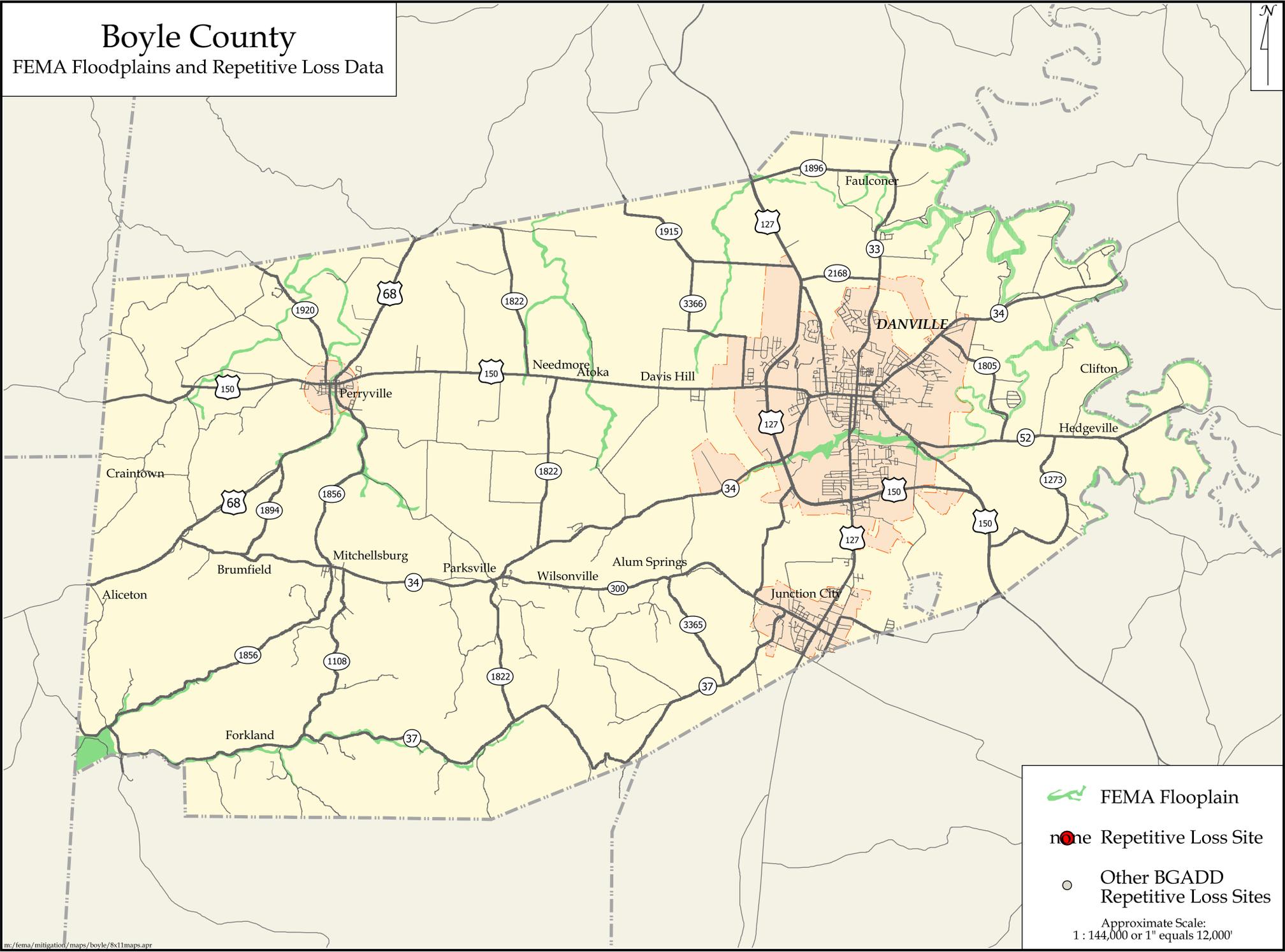


-  FIRE
-  GOVERNMENT BUILDING
-  MOBILE HOME CONCENTRATION
-  ROAD MAINTENANCE
-  SCHOOL
-  AIRPORT
-  HOSPITAL
-  FEMA FLOODPLAIN

Approximate Scale:  
1 : 144,000 or 1" equals 12,000'

# Boyle County

FEMA Floodplains and Repetitive Loss Data

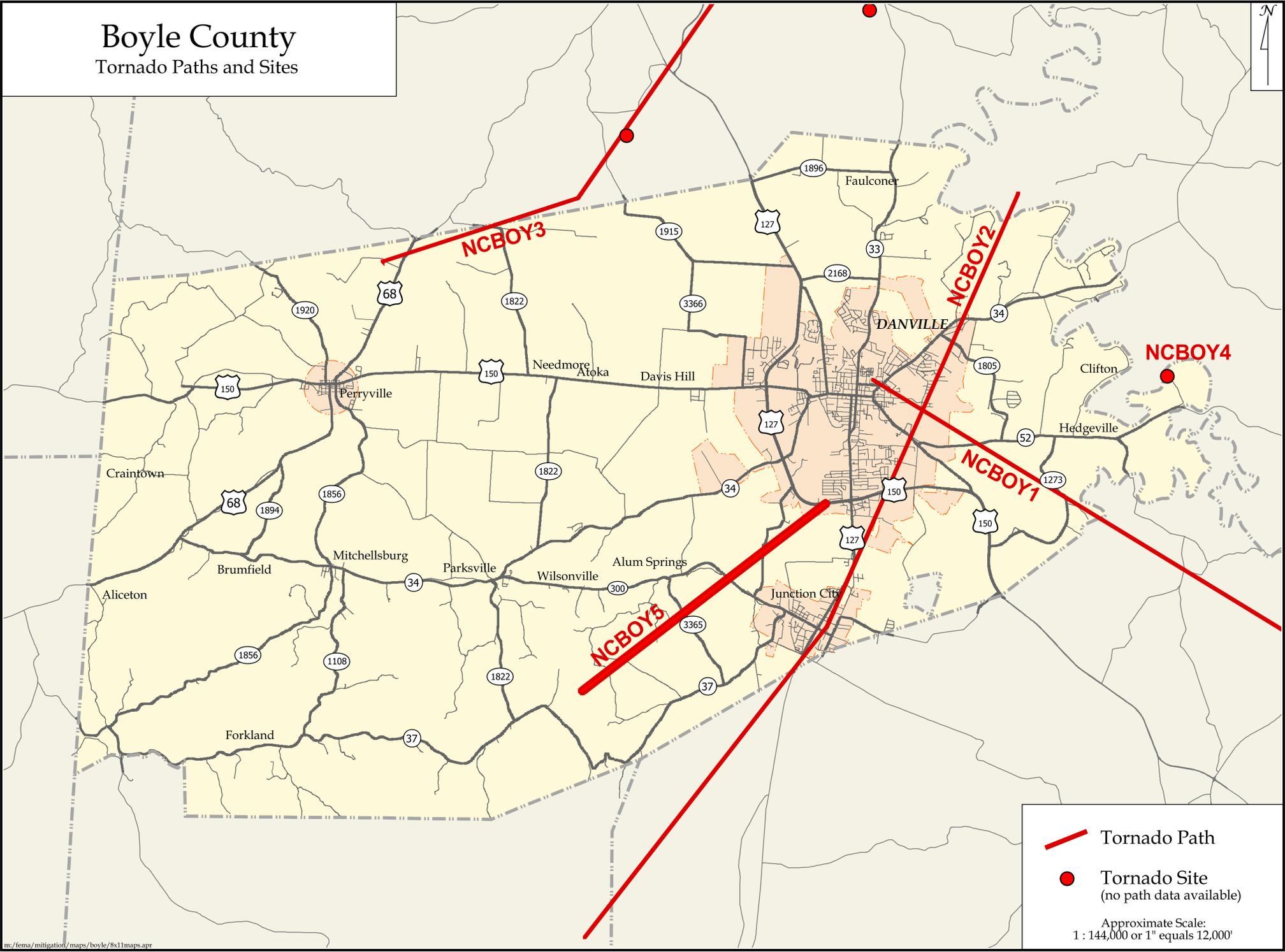


-  FEMA Floodplain
-  Repetitive Loss Site
-  Other BGADD Repetitive Loss Sites

Approximate Scale:  
1 : 144,000 or 1" equals 12,000'

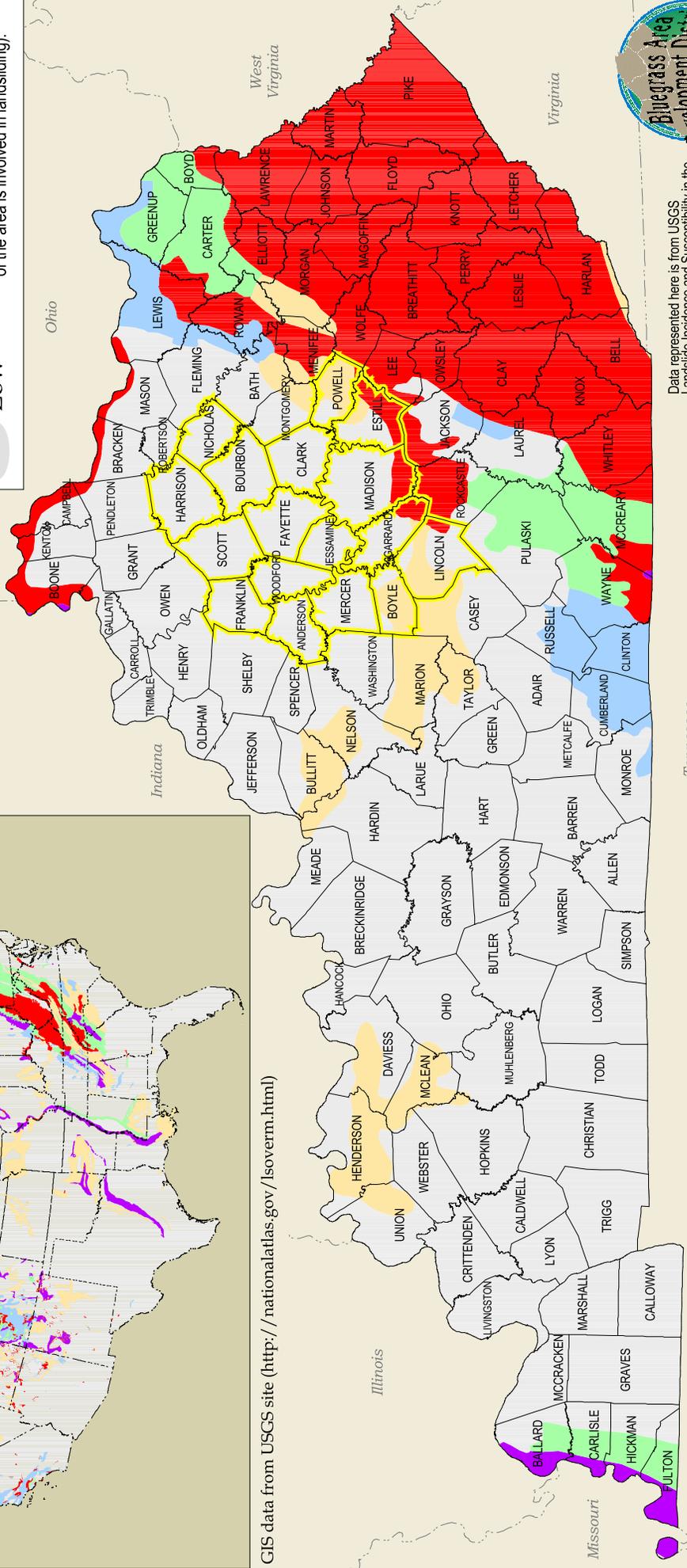
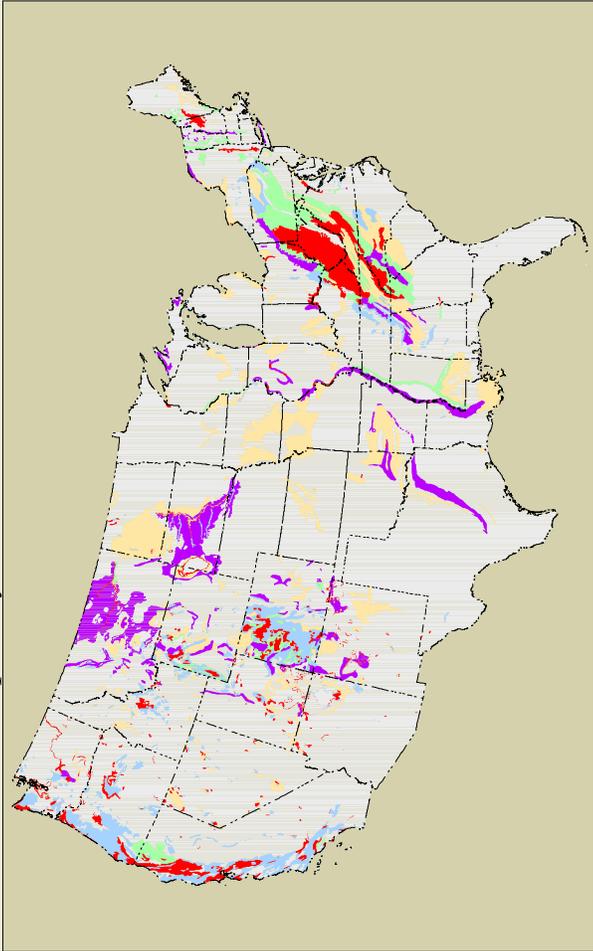
# Boyle County

## Tornado Paths and Sites



# Landslide Susceptibility & Incidence in Kentucky

The USGS has categorized areas of the conterminous U.S. based on two factors: probability of future landslide based on geology, and recorded occurrence of landslide in the past. These two studies have been synthesized into one spatial data layer which assigns areas different values based on both susceptibility and incidence.



GIS data from USGS site (<http://nationalatlas.gov/isoform.html>)

Data represented here is from USGS Landslide Incidence and Susceptibility in the Conterminous United States, 2001. The purpose of this data set is to give the user a general indication of areas that may be susceptible to landsliding. It is not suitable for local planning or site selection.

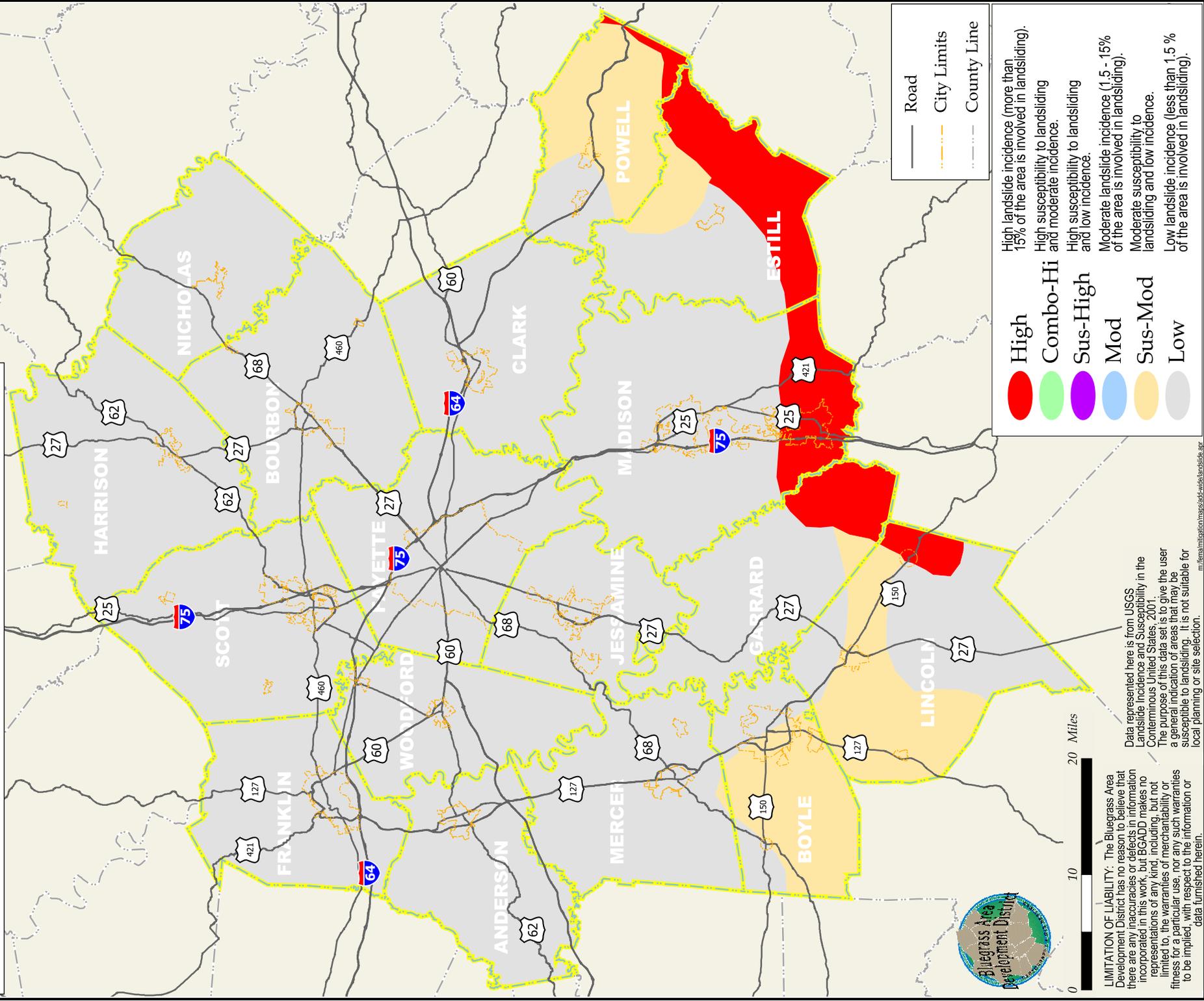


[m.fema.mitigationmaps.com/landslide.apr](http://m.fema.mitigationmaps.com/landslide.apr)

Map prepared by Bluegrass Area Development District (2004) for FEMA-HAZUS Mitigation Planning



# Bluegrass Area Development District Landslide Susceptibility & Incidence



	<b>High</b>	High landslide incidence (more than 15% of the area is involved in landsliding).
	<b>Combo-Hi</b>	High susceptibility to landsliding and moderate incidence.
	<b>Sus-High</b>	High susceptibility to landsliding and low incidence.
	<b>Mod</b>	Moderate landslide incidence (1.5 - 15% of the area is involved in landsliding).
	<b>Sus-Mod</b>	Moderate susceptibility to landsliding and low incidence.
	<b>Low</b>	Low landslide incidence (less than 1.5% of the area is involved in landsliding).

0 10 20 Miles



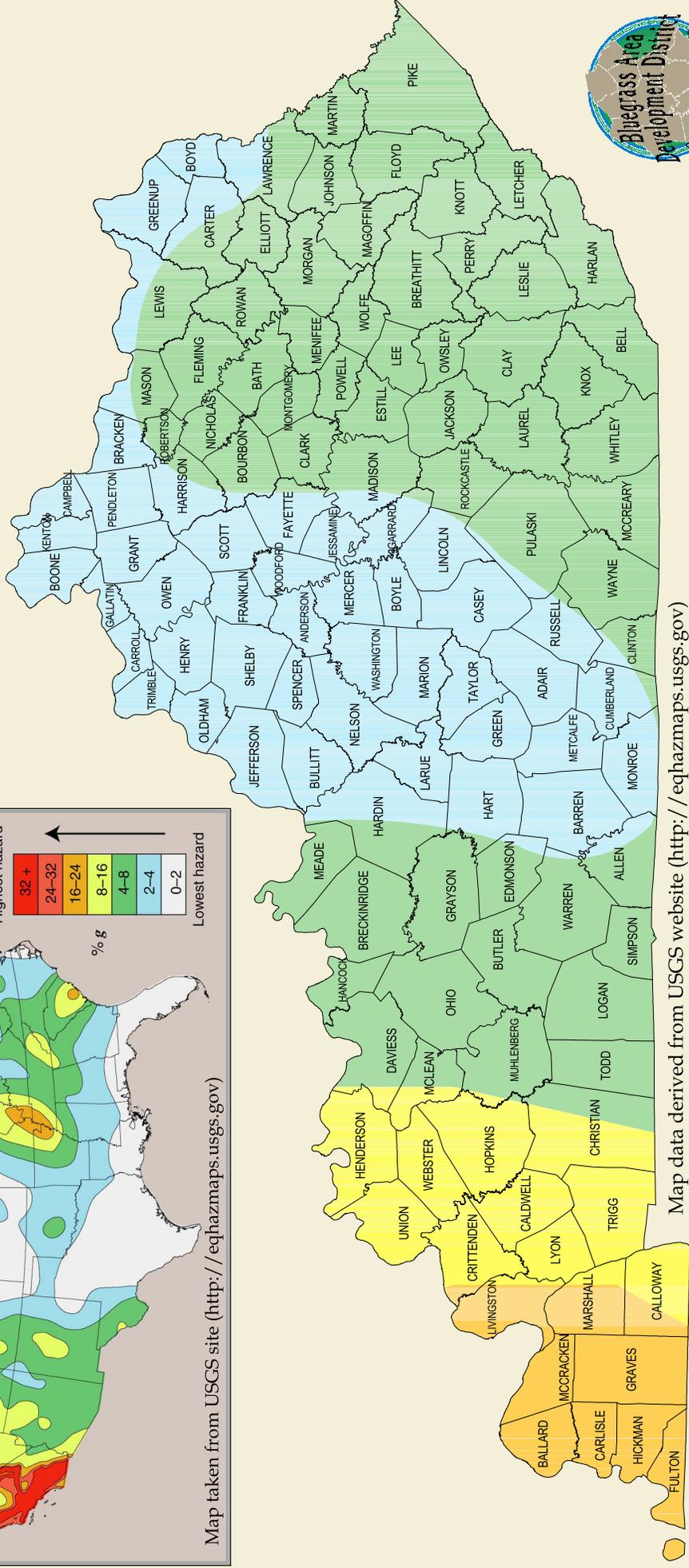
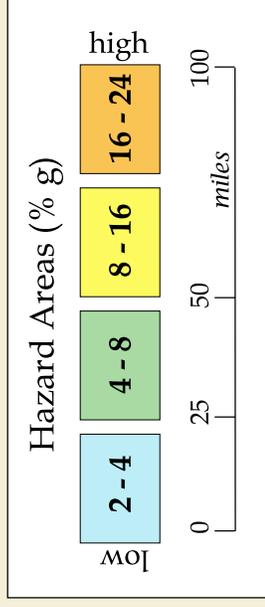
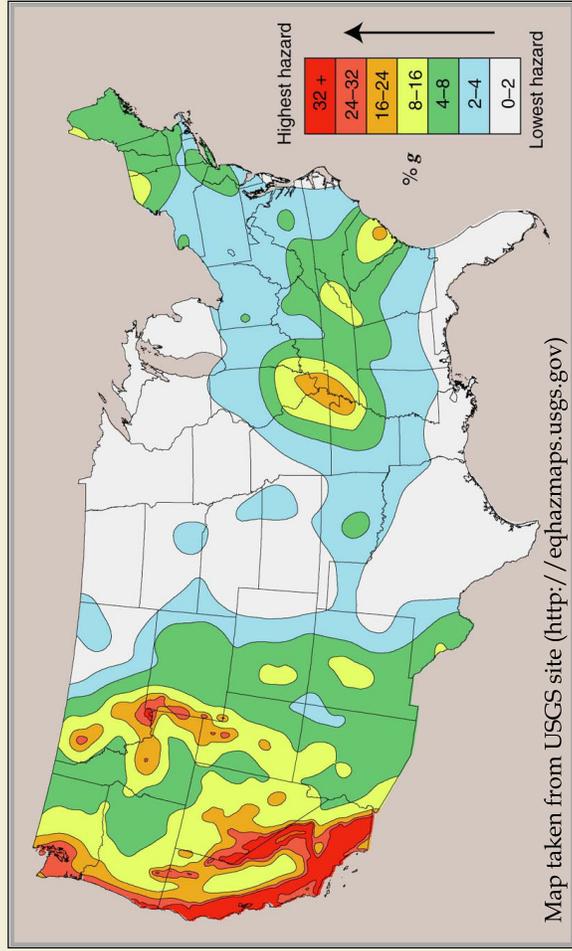
**LIMITATION OF LIABILITY:** The Bluegrass Area Development District has no reason to believe that there are any inaccuracies or omissions in information incorporated in this work, but BGADD makes no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor any such warranties to be implied, with respect to the information or data furnished herein.

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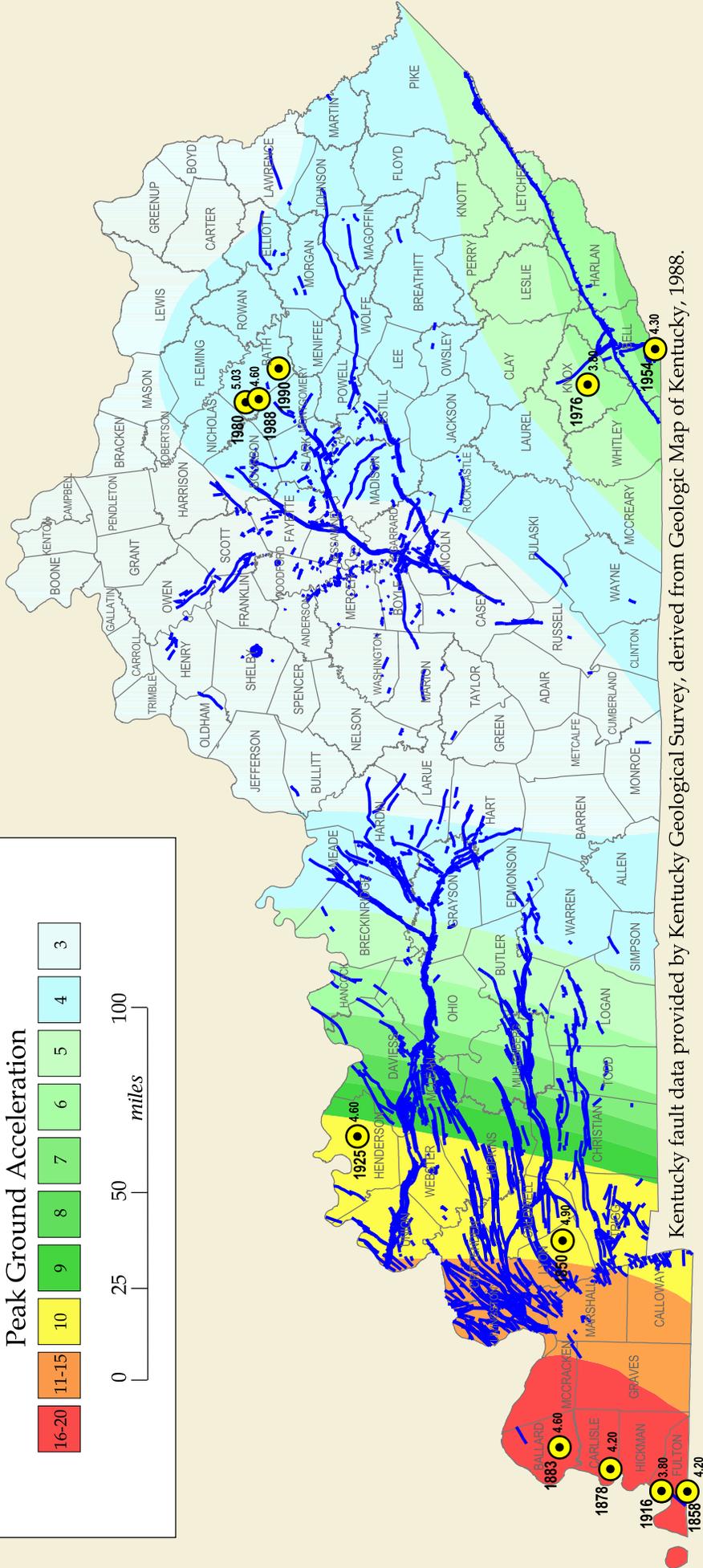
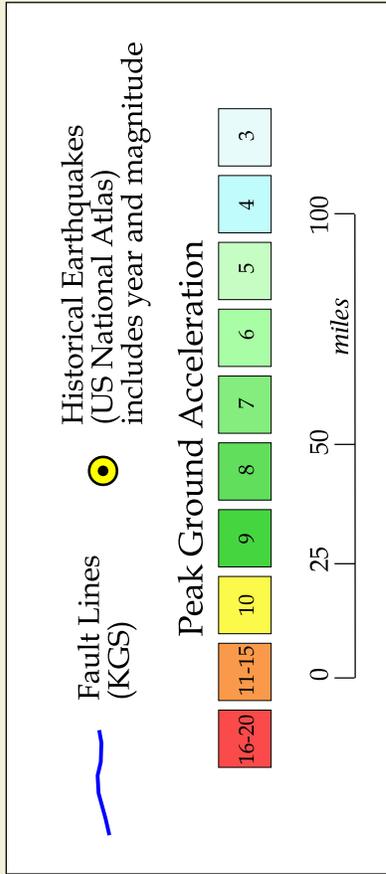


# Seismic Hazards of Kentucky

A seismic hazard is the hazard associated with potential earthquakes in a particular area. The following information was obtained on the USGS Earthquake Hazards Program website.



# Peak Ground Acceleration/Faults/Historic Earthquakes



Kentucky fault data provided by Kentucky Geological Survey, derived from Geologic Map of Kentucky, 1988.