

**2022 FRANKLIN COUNTY/CITY OF FRANKFORT
HAZARD MITIGATION PLAN**

BLUEGRASS AREA DEVELOPMENT DISTRICT

Chapter 1: PLANNING PROCESS

§201.6(b): Planning process. An open public involvement process is essential to the development of an effective plan. To develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

§201.6(c)(1): [The plan shall include...] (1) Documentation of the planning process used to develop including how it was prepared, who was involved in the process, and how the public was involved.

This section includes a discussion and information about various DMA 2000 requirements, the regional and local subcommittees, their purpose and role in the process, as well as identifying the lead team members, committee members, other stakeholders, and activities within each county over the course of the update process.

Bluegrass Area Development District Composition and Governance

The Bluegrass Area Development District (BGADD), along with 14 other Area Development Districts, are nonprofit organizations established by the Commonwealth of Kentucky in 1971. The BGADD is comprised of sixteen (16) counties, one (1) urban county government, and thirty-one (31) municipalities. This Hazard Mitigation Plan Update document will focus on Franklin County and the City of Frankfort. BGADD will be responsible for maintaining this Hazard Mitigation Plan.

As required by legislation, the Board of Directors of the BGADD is composed of 51 percent elected officials (County Judge/Executives and Mayors) with the remaining board members from aging, business, education, emergency, services, finance, industry, labor, low income, minorities, utilities, and women.

Update Process and Grants

The Bluegrass Area Development District applied for and received a Hazard Mitigation Grant Program (HMGP) grant to fund the 2021/2022 Bluegrass Area Development District Multi-Jurisdictional, Multi-Hazard Mitigation Plan Update.

After receiving the grant award, staff met with representatives of Kentucky Emergency Management (KYEM) to discuss the process and the “next steps”. A kickoff meeting was scheduled for and held on May 6, 2021 and was well attended. This marked the first Regional Subcommittee Meeting held for the process.

The Planning Team

The main planning team for the hazard mitigation update is comprised primarily of BGADD staff. The staff members from the ADD will be responsible for organizing the data received, setting up, attending, and conducting all of the required meetings, managing the stakeholders and public participation, and drafting the plan that will be sent to the State and FEMA for approval.

Planning Team Members		
Name	Title	Contact
Shane New	Director of Community Planning	shanen@bgadd.org
Greyson Evans	Economic Development Specialist	gevans@bgadd.org
Logan Hart	Community Development Specialist	lhart@bgadd.org
Austin Bates	GIS Specialist	abates@bgadd.org
Natalie Flores-Esquivel	Transportation Planner/Regional Land-Use Planner	nfesquivel@bgadd.org
Mikaela Gerry	Regional Land-Use Planner	mgerry@bgadd.org
Alex Sergent	Community Planning Intern	asergent@bgadd.org
Zach Akers	Community Planning Intern	zakers@bgadd.org

Local Subcommittee

Each local subcommittee is comprised of a host of stakeholders that serve the community’s needs. These stakeholders work for the Emergency Management, Fire and Police Departments, Sheriff’s Office, Planning Departments, Judge/Executive and Mayors’ Offices, Health Care (i.e., hospitals, health departments) and School Districts. The local subcommittee lists originated from each County’s Local Emergency Planning Committee.

Franklin County and City of Frankfort Local Subcommittee Team			
Name	Agency/Firm	Position	Contact
Andrea Boyd	Kentucky Department of Education (KDE)	Supervisor	andrea.boyd@ky.gov
Andrew Renn	Buffalo Trace	Health and Safety Manager	arenn@buffalotrace.com
Benny Robinson	State Fire Marshal's Office	Hazardous Materials Inspector	benny.robinson@ky.gov
Brian Claypool	LG&E/KU	Emergency Management Outreach Coordinator	brian.claypool@lge-ku.com
Carey Johnson	Kentucky Division of Water (DOW)	Director	carey.johnson@ky.gov
Charles Adams	Frankfort Police Department	Police Chief	cadams@frankfort.ky.gov
Charlie Lewis	Franklin County Fiscal Court	Park Director	charlie.lewis@franklincounty.ky.gov
Chris Quire	Franklin County Sheriff's Office	Sheriff	chris.quire@franklincountyky.com
Clair Brendel	Red Cross KY	Regional Planning and Preparedness Manager	clair.brendel@redcross.org
Curt Sayre	Salvation Army Frankfort	Major/Salvation Army Officer	curtis.sayre@uss.salvationarmy.org
Danny Brooks	Kentucky Finance and Administration Cabinet	Project Manager	danny.brooks@ky.gov
David Gipson	City of Frankfort	Streets Foreman	dgipson@frankfort.ky.gov
Deron Rambo	Frankfort Plant Board (FPB)	Network Operations Director	drambo@frankfort.ky.gov
Eric Robinson	Kentucky State University (KSU)	Senior Health, Safety, and Environmental Lead	eric.robinson@kysu.edu
Houston Barber	Frankfort Independent Schools	Superintendent	houston.barber@frankfort.kyschools.us
Huston Wells	Franklin County Fiscal Court	Judge/Executive	huston.wells@franklincounty.ky.gov
Jake Banta	Franklin County Regional Jail	Jailer	jake.banta@franklincountyky.com
James Turner	Harrod Concrete and Stone	Safety Director	harrodcobturner@gmail.com
Jason Childers	Kentucky Office of Homeland Security (KOHS)	Security Coordinator	jason.childers@ky.gov
Jeff Abrams	Franklin County Schools	School Safety Coordinator	jeffrey.abrams@franklin.kyschools.us
Jennifer Bardroff	Franklin County Health Department	Health Inspector	jenniferK.Bardroff@ky.gov
Joe Sanderson	Department of Military Affairs (DMA)	Director	joe.d.sanderson2.nfg@mail.mil
Jon Mitchell	Franklin County Fiscal Court	County Road Department Superintendent	jon.mitchell@franklincounty.ky.gov

Franklin County and City of Frankfort Local Subcommittee Team			
Name	Agency/Firm	Position	Contact
Keenan Bishop	University of Kentucky Franklin County Extension Office	County Extension Agent for Agriculture and Natural Resources Education	kbishop@email.uky.edu
Kenny Hogsten	Frankfort Sewer Department (FSD)	Director	khogsten@frankfort.ky.gov
Kevin Hutcherson	Franklin County Fire Department	Fire Chief	kevin.hutcherson@franklincounty.ky.gov
Kim Phillips	Frankfort Plant Board (FPB)	Safety Director	kphillips@fewpb.com
Layne Wilkerson	City of Frankfort	Mayor	lwilkerson@frankfort.ky.gov
Lindsay Kampfer	Bluegrass Care Navigators	Counseling Resource Officer	lkampfer@bgcarenav.org
Marc Wood	Frankfort/Franklin County Emergency Management Agency (EMA)/Office of Homeland Security (OHS)	Deputy Director	mwood@frankfort.ky.gov
Michael Durham	Topy America, Inc. ~ Frankfort	Warehouse Team Lead	mdurham@topyamerica.com
Ray Kinney	Frankfort/Franklin County Emergency Management Agency (EMA)/Office of Homeland Security (OHS)	Deputy Director	rkinney@frankfort.ky.gov
Scott Tipton	Kentucky Transportation Cabinet (KYTC)	TEBM – PD&P Branch II (Shelbyville Section)	scott.tipton@ky.gov
Shannon Barker	Columbia Gas	Employee	sbarker@nisource.com
Shelley Hearn	Cabinet for Health and Family Services (CHFS) Adult Protection Branch	Community Policing Advocate/Social Worker	shelley.hearn@ky.gov
Tim Bradley	Legislative Research Commission (LRC)	Security Officer	tim.bradley@lrc.ky.gov
Tish Shade	Frankfort Chamber of Commerce	President/CEO	tish@frankfortky.info
Tom Russell	Frankfort/Franklin County Emergency Management Agency (EMA)/Office of Homeland Security (OHS)	Director	trussell@frankfort.ky.gov
Tony Ising	Jim Beam	EHS Senior Manager	tony.ising@beamsuntory.com
Tony Lorenzo	Frankfort Regional Medical Center	Certified Registered Nurse Anesthetist (CRNA)	anthony.lorenzo@hcahealthcare.com

Franklin County and City of Frankfort Local Subcommittee Team			
Name	Agency/Firm	Position	Contact
Wayne Briscoe	Frankfort Fire Department	Fire Chief	wbriscoe@frankfort.ky.gov
Robert Hewitt	Planning & Building Codes at Franklin County	Director	robert.hewitt@franklincounty.ky.gov
Eric Cockley	City of Frankfort Planning & Community Development	Director	ecockley@frankfort.ky.gov

Subcommittee Activities

Staff, between June 2021 and January 2022 held (3) meetings in Franklin County¹ to discuss the hazards that both the City of Frankfort and Franklin County encounter perennially. These meetings not only focused on each hazard, but also targeted the goals and objectives and actionable policies to prevent the deleterious effects from future disaster events. All meetings invited those agencies and departments that would need to partner with the counties and cities to meet mitigation goals and objectives and to complete any projects (i.e., state agencies, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, neighboring communities, and other interests). Government officials and members of the public were also presented with the opportunity to assist in the drafting process of the plan itself. Each project discussed would help to either mitigate future disaster effects, or would help lessen loss of life or property, or increase educational opportunities for residents.

Following is a table that outlines a general summary of what was discussed at each meeting.

Franklin County Activities	
Meeting Dates	Topics
1 st Meeting: July 12, 2021	Introduction to hazard mitigation, review of 2016 Plan (county-specific portions), overview of relevant hazard types, risk assessment by hazard (extent, frequency, recent events, etc.). Gathering qualitative data from relevant stakeholders.
2 nd Meeting: August 9, 2021	Presentation and review of initial risk assessment. Identification of critical infrastructure and problem areas within the county.
3 rd Meeting: November 8, 2021	Disaster response discussion, mitigation project identification, discussion of funding mechanisms and available grant programs.
4 th Meeting: TBD	Final drafting meeting. Adoption of the 2022 Hazard Mitigation Plan

¹ Each meeting held at the Frankfort/Franklin County Emergency Operations Center at 300 W Second St., Frankfort, KY 40601

Public Participation and Activities

Generally, all formal hazard mitigation plan meetings (where drafting of the plan for all of the counties and cities comprising the Bluegrass Area Development District (BGADD), public involvement was fostered by attempting to host at least four (4) meetings for each of the ADD's sixteen² (16) counties at well-known locations within each county (i.e., City Halls, Emergency Operations Centers, Libraries, and other similar buildings). The main goal of these meetings, aside from satisfying minimum FEMA requirements for public involvement, was to educate the public about the hazard mitigation planning process, set goals and objectives, assess each county's overall vulnerability, and set mitigation actions. Some of the meetings were well attended with many stakeholders that helped move the plan forward, while others lacked attendance and support.

In addition to holding four local subcommittee meetings in each county, in 2021 BGADD staff also held two regional subcommittee meetings via Zoom. These meetings were held to discuss the regional aspects of the update including grant and funding sources available to communities in the BGADD region. Staff repeatedly encouraged each county's Emergency Management Director to mention the meetings on social media.

In an effort to conduct outreach and improve public participation, BGADD staff and/or local EMA directors sent out mass email invites to all stakeholders, including local boards and public employees. Further, in an attempt to involve each local community and county residents in the process, the BGADD made all information for each meeting available on our website. In addition to the documents and agenda available for download on our website, anyone interested in being involved in the process could add their names and emails to the email lists. The ADD also prepared and distributed a public input survey via its website, which gave residents the opportunity to provide input throughout the planning process. Further, each adoption meeting will be opened to the public and the plan will remain on the Bluegrass ADD website for comment.

After the Plan is finished, Bluegrass ADD intends to continue to take comments from the public to add to the next update. Currently Bluegrass ADD is designing a web portal for EM directors to add hazards and disasters to a map in real-time. The goal of this added feature is to increase input from EM directors and allow the public to input additional data such as costs associated with damages sustained during marked events.

² Fayette County (or Lexington/Fayette Urban County Government) is the Bluegrass Area Development District's seventeenth (17th) county. However, it has a multi-hazard mitigation plan independent from the plan for which Franklin County and the City of Frankfort and the remaining sixteen (16) counties and the respective incorporated cities comprising BGADD will adopt.

Attendees

Meeting #1

Name	Title	Organization
Keenan Bishop	Extension Agent	Franklin County Extension Office
Jennifer Bardroff	Emergency Prep Manager	Franklin County Health Department
Wes Willis	Deputy Director	Franklin County EMA
Daniel Doss	Streets Foreman	City of Frankfort
Allison Jarrell	Safety Specialist	Finance Facilities
Danny Brooks	Safety Advisor	Finance Facilities
Benny Robinson	Haz Mat Inspector	State Fire Marshall
Tambra Harrod	Deputy Judge/Executive	Franklin County
Huston Wells	Judge/Executive	Franklin County
Jordan Miller	Senior Planner	City of Frankfort
Wayne Briscoe	Fire Chief	Frankfort Fire Department
Kim Phillips	Safety Director	Frankfort Plant Board
Curt Sayre	Commanding Officer	Salvation Army
Ray Kinney	Deputy Director	Franklin County EMA
Tom Russell	EM Director	Franklin County EMA
Anthony Lorenzo	Disaster Preparedness Coordinator	HCA Healthcare
Chuck Adams	Police Chief	Frankfort Police Department
Chuck Ammons	Assistant Director of Facilities and Maintenance	Department for Military Affairs – Commonwealth of Kentucky
James Turner	Safety Director	Harrod Concrete
Jon Mitchell	Superintendent	Franklin County Road Department
Logan Hart	Community Development Specialist	BGADD
Layne Wilkerson	Mayor	City of Frankfort
Eric Robinson	Branch Manager	Chase Environmental Group
Shelly Hearn	Social Services Specialist	CHFS
Timothy Bradley	Security Officer	KY LRC

Meeting #2

Name	Title	Organization
Andrea Boyd	Supervisor	KDE
Anthony Lorenzo	Disaster Preparedness Coordinator	Frankfort Regional Medical Center
Bobby Rippy	Information Technology	City of Frankfort
Brian Brewer	Assistant Fire Chief	Franklin County Fire Department
Brittany Parker	Deputy Public Health Director	Franklin County Health Department
Charles Adams	Fire Chief	Frankfort Fire Department
Chuck Ammons	Assistant Director of Facilities and Maintenance	Department for Military Affairs – Commonwealth of Kentucky
Corinne Schwab	Health, Safety and Environmental Coordinator	Kentucky State University
Curt Sayre	Commanding Officer	Salvation Army
Deron Rambo	Network Operations Director	Frankfort Plant Board
Danny Brooks	Safety Advisor	Finance and Administration Cabinet
Ray Kinney	Deputy Director	Franklin County EMA
Greg Ramey	Information Technology	Franklin County Health Department
Huston Wells	Judge/Executive	Franklin County
Jake Banta	Jailer	Franklin County
Kim Phillips	Safety Director	Frankfort Plant Board
Layne Wilkerson	Mayor	City of Frankfort
Rebecca L. Hardin	Regional Preparedness Coordinator	Franklin County Health Department
Eric Robinson	Manager, H.S.E Safety	Kentucky State University
Shelley Hearn	Social Services Specialist	CHFS
Tambra Harrod	Deputy Judge/Executive	Franklin County
Timothy Bradley	Security Officer	KY LRC
Wayne Briscoe	Fire Chief	Frankfort Fire Department
Daniel Doss	Foreman	City of Frankfort
Jordan Miller	Senior Planner	City of Frankfort
Jennifer Bardroff	Emergency Prep Manager	Franklin County Health Department
Wes Willis	Deputy Director	Franklin Co./Frankfort EMA

Meeting #3

Name	Title	Organization
Brian Claypool	Emergency Management Outreach Coordinator	LG&E/KU
Wayne Briscoe	Administrator	Franklin Co. Dems
Deron Rambo	Deputy Director	FPB
Charles Adams	Chief	Frankfort PD
Kenny Hogsten	Director	FSD
Daniel Doss	Foreman	Franklin Co. Street Dept
Jordan Miller	Planning and Zoning	City of Frankfort
Wes Willis	Deputy Director	Franklin Co./Frankfort EMA

Source Material Used for New Plan

Staff used source material from various documents to draft this plan. Referenced materials included the 2011 Hazard Mitigation Plan, the 2016 Hazard Mitigation Plan, and previous Hazard Mitigation Plans from other jurisdictions. In order to obtain technical information, staff cited NOAA, FEMA, United States Census Bureau and the American Community Survey (ACS), Kentucky Geological Survey, Kentucky Division of Forestry, and the Kentucky Transportation Cabinet. The BGADD GIS Department provided mapping for the project referencing each local jurisdiction as well as local and state collected data for the local hazard maps while using mapping services provided by ESRI.

Chapter 2: HAZARD IDENTIFICATION AND RISK ASSESSMENT

The following section profiles each natural hazard identified as affecting the region. The identified hazards that pose a threat to Franklin County include earthquakes, floods, karst, landslides, severe storms and tornadoes, severe winter storms, and wildfires. The profiles capture historical occurrences for each hazard. The process included updating occurrence data, reviewing hazard specific data information, and conversing with stakeholders.

Local and Regional Ranking System

The local ranking of each hazard shall be obtained through discussion with local officials and based on the number of reported occurrences in the past, number of injuries and fatalities, and reported damage. These local vulnerability rankings were then used as part of the overall regional ranking system. Possible rankings included the terms LOW (1), MODERATE (2), and HIGH (3). A LOW ranking refers to any hazard or impact that has a low historical occurrence or cost. A HIGH ranking refers to any hazard or impact that falls between LOW and HIGH. Once each county ranked future potential disasters, total impact (\$), and each counties' historical occurrence (local ranking) of each hazard, an overall average was calculated for the region for each hazard. These values are subjective and are based on the opinions of local emergency management staff and members of the public.

HAZARD ³	PROBABILITY OF FUTURE EVENTS	IMPACT (\$)	AVERAGE
Earthquakes	1	1	1
Flooding	3	3	3
Karst	1	1	1
Landslides	3	3	3
Severe Storms and Tornadoes	2.5	3	2.75
Severe Winter Storms	2	3	2.5
Wildfires	3	2	2.5

³ It is relevant to note that the "Drought" hazard will not be analyzed for this 2022 hazard mitigation plan risk assessment: Using the Palmers Drought Severity Index and the National Center for Environmental Information's Storm Events database, there have zero (0) instances of drought for the Franklin County/City of Frankfort area. Generally, for all counties and cities comprising the Bluegrass Area Development District, drought is a non-existent hazard: Central Kentucky is too seasonal and has far too much water. Additionally, participants to the planning process expressed very little concern and, thusly, proposed no mitigation actions that dealt with drought.

Earthquakes

An earthquake is a sudden, rapid shaking of the Earth caused by breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free releasing the stored energy and producing seismic waves generating an earthquake. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. However, some earthquakes occur in the middle of plates.

Ground motion, the movement of the Earth's surface during earthquakes or explosions is the catalyst for most of the damage done during an earthquake. Produced by waves generated by a sudden slip on a fault or sudden pressure at the explosive source, ground motion travels through the earth and along its surface. Ground motions are amplified by soft soils overlying hard bedrock, referred to as ground motion amplification. Ground motion amplification can cause an excess amount of damage during an earthquake, even to sites very from the epicenter.

Earthquakes strike suddenly and without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world.

Ground shaking from earthquakes can collapse buildings and bridges, disrupt gas, electric, and phone service, and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries and extensive property damage.

Earthquakes are measured in terms of their magnitude and intensity using the Richter Scale and Modified Mercalli Scale of Earthquake Intensity.

The Richter magnitude scale measures an earthquake's magnitude using an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. The earthquake's magnitude is expressed in whole numbers and decimal fractions. Each whole number increase in magnitude represents a 10-fold increase in measured wave amplitude, or a release of 32 times more energy than the preceding whole number value.

Extent for Earthquakes

Modified Mercalli Intensity Scale

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

Richter Scale to Modified Mercalli Intensity Scale (MMS) Comparison

Richter Scale Magnitude	Description	MMS
1.0-1.9	Not Felt/Micro	I
2.0-2.9	Minor	I to II
3.0-3.9	Minor	III to IV
4.0-4.9	Light	IV to VI
5.0-5.9	Moderate	VI to VII
6.0-6.9	Strong	VIII to X
7.0-7.9	Major	X or Greater
8.0-8.9	Great	X or Greater
9.0 and Greater	Great	X or Greater

A. Seismic Zones Affecting Kentucky

1. *New Madrid Seismic Zone*: Located in the central Mississippi Valley, the northern end of the New Madrid Seismic Zone (NMSZ) is marked approximately by the confluence of the Ohio and Mississippi Rivers. From this point in southern Illinois, the zone runs southwest, through western Kentucky (near Fulton), through eastern Missouri and western Tennessee to terminate in northeastern Arkansas. Along this course, the NMSZ crosses the Mississippi River three times.
2. *Wabash Seismic Zone*: The Wabash Seismic Zone that threatens southern Illinois, Indiana, and Kentucky shows evidence of large earthquakes in its geologic history. Additionally, there may be other unidentified faults that could produce strong earthquakes. Since 1895, the Wabash Valley Fault Zone has experienced more moderate quakes than the New Madrid Seismic Zone. Some prehistoric quakes that occurred in this zone between 4,000 and 10,000 years ago may have been larger than M 6.0. Earthquake ground shaking is amplified by lowlands soils, and modern earthquakes of M 5.5 – 6.0 in the Wabash Valley Fault Zone could cause substantial damage if they occur close to the populated river towns and cities along the Wabash River and its tributaries.
3. *Eastern Tennessee Seismic Zone*: The Eastern Tennessee Seismic Zone, which extends from southwest Virginia to northeast Alabama, is one of the most active seismic zones in the southeastern United States. Although this zone has not had a major earthquake in historic times, a few earthquakes have caused damage. The largest recorded earthquake in this seismic zone was a magnitude 4.6 quake that occurred in 1973 near Knoxville, Tennessee. Sensitive seismographs have recorded hundreds of earthquakes too small to be felt in this seismic zone. Small, non-damaging earthquakes that can still be felt occur about once a year. No evidence for larger prehistoric shocks has been discovered, yet the microearthquake data suggests coherent stress accumulation within a large volume. Physical processes for reactivation of basement faults in this region could involve a weak lower crust and/or increased fluid pressures within the upper to middle crust.

A. Earthquake Prediction

The goal of the earthquake prediction is to give warning of potentially damaging earthquakes early enough to allow appropriate response to the disaster, enabling people to minimize loss of life and property. The U.S. Geological Survey conducts and supports research on the likelihood of future earthquakes. This research includes field, laboratory, and theoretical investigations of earthquake mechanisms and fault zones. A primary goal of earthquake research is to increase the reliability of earthquake probability estimates. Ultimately, scientists would like to be able to specify a high probability for a specific earthquake, on a particular fault, within a particular year. Scientists estimate earthquake probabilities in two ways: by studying the history of the earthquakes in a specific area, and by the rate at which strain accumulates in the rock.

Evidence that earthquakes threaten the Mississippi, Ohio, and Wabash River valleys of the central United States abounds. In fact, one of the largest earthquakes to strike the continental United States occurred in the winter of 1811-1812 along the New Madrid Seismic Zone, which stretches from just west of Memphis, Tennessee, into southern Illinois. Several times in the past century, moderate earthquakes have been widely felt across southern Illinois and southwestern Indiana. Geologic evidence for prehistoric earthquakes throughout the region has been increasing since the late 1970s. The largest earthquake that had an epicenter *within* Kentucky's borders was the Sharpsburg earthquake on July 27, 1980 (USGS). Sharpsburg is located roughly 65 miles from Frankfort, the county seat of Franklin County.

As with many other natural phenomena, how an earthquake impacts people depend on multiple factors. Studying earthquakes is especially challenging because they are infrequent and take place without any advanced warning. Also, the forces that cause earthquakes build up over many thousands of years and take place deep below the Earth's surface.

B. History

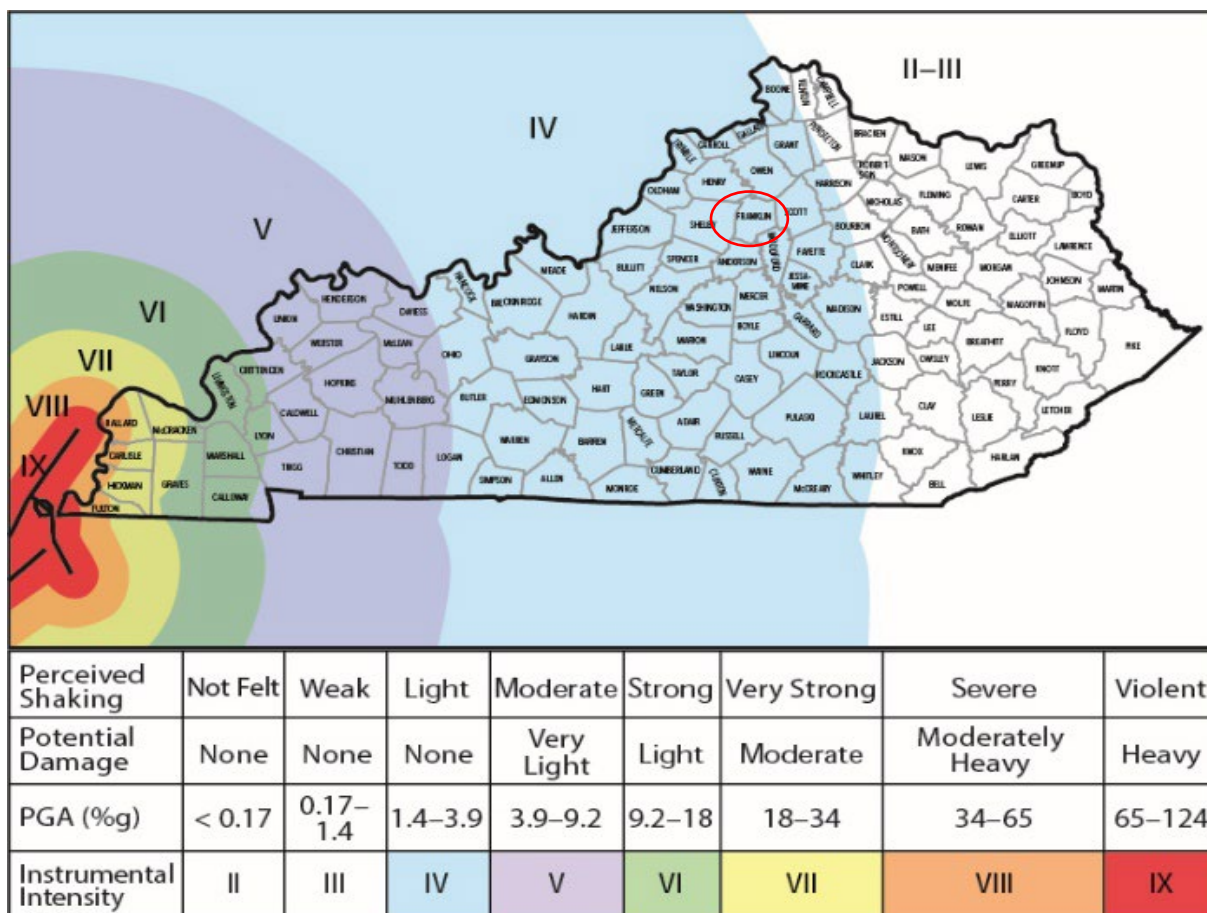
The largest earthquake in Kentucky history occurred in the Bath County town of Sharpsburg in July of 1980. The Sharpsburg earthquake was a 5.1 Richter scale earthquake with its epicenter located 50 miles northeast of Lexington. The entirety of the Bluegrass ADD region experienced a Modified Mercalli's Intensity (MMI) Scale Level of IV or V throughout the region. The out-of-state earthquakes that have had the greatest impact on central Kentucky were the 1811 and 1812 New Madrid, Missouri earthquakes which caused MMI level V effects in central Kentucky.

Higher intensity levels could occur in the region due to changing geographical circumstances in plate tectonics and the number of faults in the central Kentucky region. Earthquakes have the potential to damage critical infrastructure, such as the Clay's Ferry Bridge on Interstate 75 in nearby Madison County, which is located directly above a fault line. An earthquake could also lead to an influx of displaced residents from neighboring communities who are seeking refuge.

Probability of and Vulnerability to an Earthquake

The Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018 provides a way to illustrate the probability of and the vulnerability to an earthquake for Franklin County and the City of Frankfort:

“Ground motion is quantitatively measured as peak ground acceleration in terms of the percentage of the acceleration of gravity or peak ground velocity in terms of centimeters of shaking, potential damage level, or instrument intensity (i.e., modified Mercalli intensity). The table [below] lists the quantitative and qualitative measurements of ground motion. The level of ground motion at a site primarily depends on its distance from the fault that ruptured and the magnitude of the earthquake. Ground motion can be estimated from scientific information about earthquakes. The top part of [the figure below] shows the median peak ground acceleration on rock from a magnitude 7.5 scenario earthquake in the New Madrid Seismic Zone (Carpenter and others, 2014), which demonstrates that such an earthquake could have a significant impact on Kentucky, western Kentucky in particular⁴.”



⁴ See page KGS-6 in the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018.

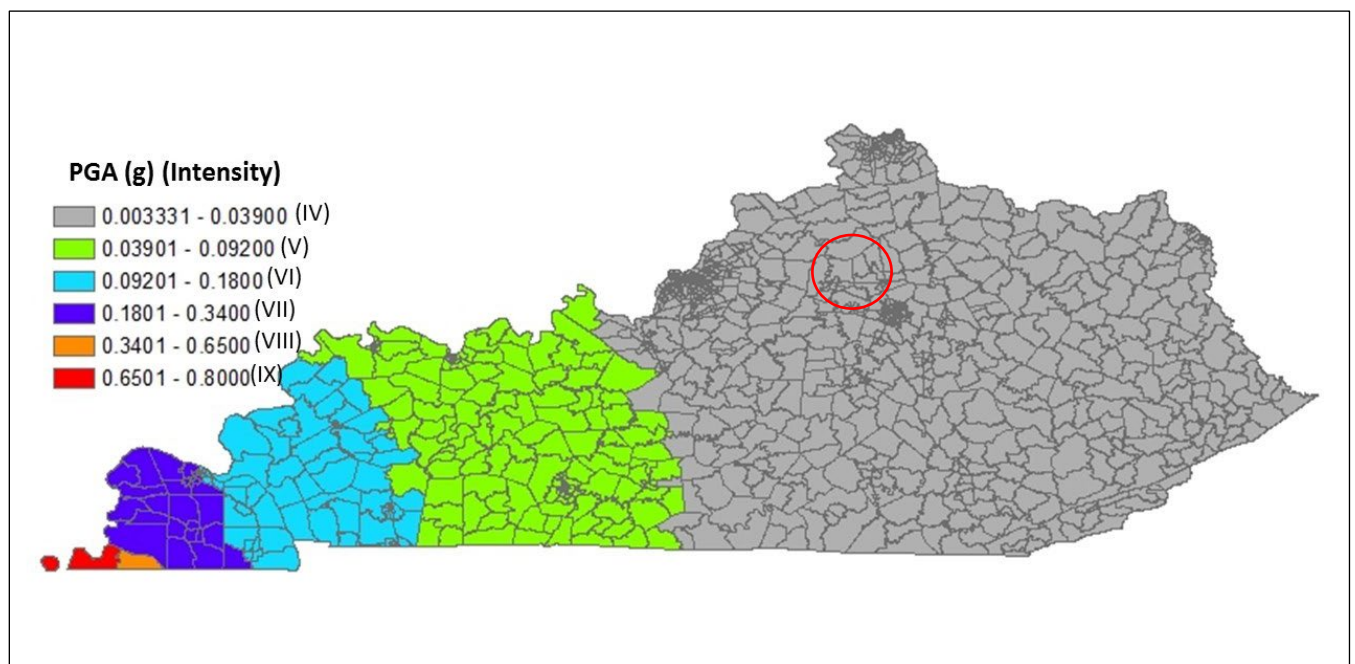
Again, using the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018, the Kentucky Geological Survey ran five (5) scenario earthquakes using FEMA’s HAZUS software and its databases. It used three (3) scenarios where the epicenter was the New Madrid Seismic Zone, one (1) scenario where the epicenter was the Wabash Valley Seismic Zone, and one (1) scenario where the epicenter was the site of the Sharpsburg earthquake (i.e., the largest earthquake occurrence within Kentucky’s borders and that measured 5.1 on the Richter scale). Before discussing the potential impacts resulting from the scenario analysis, Kentucky Geological Survey displays a de facto vulnerability and probability image that shows the Peak Ground Acceleration (PGA) (tied to the MMS) on rock should a magnitude 7.5 earthquake occur in the central New Madrid Seismic Zone:

“Five scenario earthquakes [table below] were selected to assess potential impacts using the HAZUS databases and default amplification, liquefaction, and triggered-landslide hazards. [The resulting figure below] shows peak ground acceleration on rock from the scenario earthquake of magnitude 7.5 along the central New Madrid Fault and indicates that ground-motion hazard is very high in the epicentral area, with peak ground acceleration greater than 0.65g⁵.”

Source Parameters for Scenario Earthquakes

Seismic Zone	Epicenter Location	Magnitude	Focal Depth
New Madrid I	36.52°N/-89.53°W	7.0	15 km
New Madrid II	36.52°N/-89.53°W	7.5	15 km
New Madrid III	35.50°N/-89.99°W	7.0	10 km
Wabash Valley	38.17°N/-87.71°W	6.5	15 km
Sharpsburg	38.17°N/-83.91°W	5.0	12 km

⁵ See pages KGS-9 – KGS-10 in the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018.



Peak Ground Acceleration on Rock from a Scenario Earthquake of Magnitude 7.5 in the Central New Madrid Seismic Zone (New Madrid Scenario II)

Franklin County and the City of Frankfort lie within the gray-shaded area of the above figure, i.e., with an expected intensity from a magnitude 7.5 earthquake in the New Madrid Seismic Zone having the intensity of around IV on the Modified Mercalli Intensity Scale (MMS).

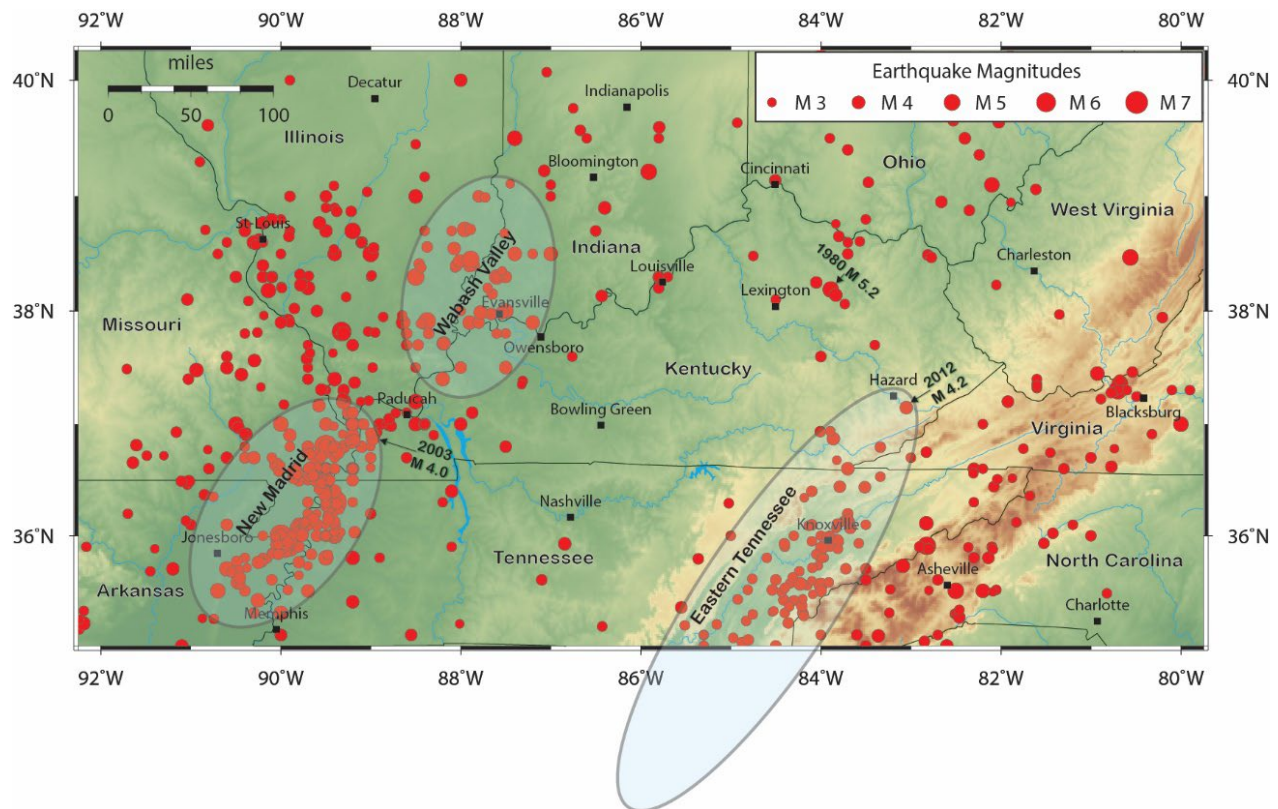
As a matter of clarification, this hazard mitigation plan document claims that the above two (2) images and citations from the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018 conveys probability, as well: This plan document assumes that Peak Ground Acceleration (PGA) is a way to think about probability for the earthquake hazard. While PGA says nothing about the probability of a future earthquake occurrence, it does provide an illustration of the probability of there being effects from an earthquake should one occur.

And should a considerable earthquake occur in the New Madrid Seismic Zone, Franklin County and the City of Frankfort both are vulnerable to and can expect in the future to have effects identified as a IV on the MMS. To remind, a IV on the MMS refers to dishes, windows, and doors being disturbed; walls making cracking sounds; sensations like a heavy truck striking a building; the noticeable rocking of standing cars. An MMS IV earthquake can be felt indoors by many and outdoors by a few during the day. If at night, an MMS IV will awaken some from sleep.

Location and Previous Occurrences of Earthquakes

The Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018 provides a helpful graphic conveying locations of earthquakes of magnitude 3 or greater that have occurred in and around Kentucky, current to 2014⁶:

Franklin County and the City of Frankfort lie between Louisville and Lexington identified in the below image.



⁶ See page KGS-4 in the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018.

Flooding

A flood is a natural event for rivers and streams. It is defined by the National Flood Insurance Program as a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area, or of two or more properties from:

A. Defined Flooding Events

1. Overflow of inland or tidal waters
2. Unusual and rapid accumulation or runoff of surface waters from any source
3. A mudflow; or,
4. A collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood.

B. Factors Determining the Severity of Floods

1. Rainfall intensity and duration
 - a. A large amount of rain over a short time can result in flash flooding
 - b. Small amounts may cause flooding where the soil is saturated
 - c. Small amounts may cause flooding if concentrated in an area of impermeable surfaces
2. Topography and ground cover
 - a. Water runoff is greater in areas with steep slope and little vegetation

C. Frequency of Inundation

Frequency of inundation depends on the climate, soil, and channel slope. In regions without extended periods of below-freezing temperatures, floods usually occur in the season of highest precipitation.

D. Types

Types of floods include regional floods, river or riverine floods, flash floods, urban floods, ice-jam floods, storm-surge floods, dam and levee failure floods, debris floods, landslide, and mudflow floods.

Regional flooding can occur seasonally when winter or spring rains coupled with melting snow fills river basins with significant amounts of water too rapidly. The ground may be frozen, reducing infiltration into the soil and thereby increasing runoff. Extended wet periods during any part of the year can create saturated soil conditions, after which any additional rain runs off into streams and rivers until river capacities are exceeded. Regional floods are many times associated with slow-moving, low-pressure, or frontal storm systems that include hurricanes or tropical storms.

River or riverine flooding is a high flow or overflow of water from a river or similar body of water, occurring over a period of time too long to be considered a flash flood.

Flash floods are quick-rising floods that usually occur as a result of heavy rains over a short period of time, often only several hours or even less. Flash floods can occur within several seconds to several hours and with little warning. They can be deadly because they often lead to rapid rises in water levels and have devastating flow velocities.

Urban flooding is possible when land is converted from open fields or woodlands to roads and parking lots; thus, losing its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds to the ground, and into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in floodwaters that rise very rapidly and peak with violent force. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with vegetative debris causing additional, localized flooding.

Ice-Jam flooding occurs on rivers that are totally or partially frozen. A rise in stream stage will break up a totally frozen river and create ice flows that can pile up on channel obstructions such as shallow riffles, log jams, or bridge piers. Storm-surge flooding is water that is pushed up onto otherwise dry land by onshore winds. Friction between the water and the moving air creates drag that, depending upon the distance of water (fetch) and the velocity of the wind, can pile water up to depths greater than 20 feet. Intense, low-pressure systems and hurricanes can create storm-surge flooding. The storm surge is unquestionably the most dangerous part of a hurricane as pounding waves create very hazardous flood currents.

Dam and Levee Failure flooding are potentially the most catastrophic flood events. A dam failure is usually the result of neglect, poor design, or structural damage caused by a major event such as an earthquake. When a dam fails, an excess amount of water is suddenly released downstream, destroying anything in its path. Dams and levees are built for flood protection. They are generally engineered to withstand a flood with a computed risk of occurrence. Failed dams or levees can cause floods that are catastrophic to life and property because of the tremendous energy of the released water.

Debris, Landslide, and Mudflow flooding is created by the accumulation of debris, mud, rocks, and/or logs in a channel, forming a temporary dam and then becomes a flash flood when the dam is breached and rapidly washes away. Landslides can create large waves on lakes or embayment and can be deadly. Mudflow floods can occur when volcanic activity rapidly melts mountain snow and glaciers, and the water mixed with mud and debris moves rapidly down the slope.

Most lives are lost when people are swept away by flood currents, whereas property damage results from an inundation by sediment-water. Flood currents also possess tremendous amounts of destructive power as lateral forces can demolish buildings and erosion can undermine bridge foundations and footings leading to the collapse of structures.

E. Previous Occurrences and Impacts

See table on following page(s)

Franklin County, Unincorporated Flooding and Flash-Flooding Types, Locations, Previous Occurrences, and Impacts

Franklin County, Unincorporated Flooding and Flash-Flooding Events, 1997-2021⁷

Count	County	Location	Date	Type	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN (ZONE)		3/1/1997	Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN (ZONE)		3/1/1997	Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	COUNTYWIDE	3/1/1997	Flash Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	COUNTYWIDE	3/1/1997	Flash Flood	0	0	\$ -	\$ -	0	0
2	FRANKLIN (ZONE)		3/2/1997	Flood	1	0	\$ 6,500,000.00	\$ -	0	0
3	FRANKLIN CO.	COUNTYWIDE	7/20/1998	Flash Flood	0	0	\$ -	\$1,000,000.00	0	0
4	FRANKLIN (ZONE)		3/20/2002	Flood	0	0	\$ -	\$ -	0	0
5	FRANKLIN (ZONE)		2/17/2003	Flood	0	0	\$ -	\$ -	0	0
6	FRANKLIN CO.	COUNTYWIDE	6/14/2003	Flash Flood	0	0	\$ 5,000.00	\$ -	0	0
7	FRANKLIN CO.	HARVIELAND	8/22/2003	Flash Flood	2	0	\$ 3,000,000.00	\$ -	0	0
8	FRANKLIN (ZONE)		5/31/2004	Flood	0	0	\$ -	\$ -	0	0
9	FRANKLIN (ZONE)		6/1/2004	Flood	0	0	\$ -	\$ -	0	0
10	FRANKLIN CO.	BRIDGEPORT	1/10/2008	Flash Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	CHOATEVILLE	1/10/2008	Flash Flood	0	0	\$ -	\$ -	0	0
11	FRANKLIN CO.	JETT	3/19/2008	Flood	0	0	\$ -	\$ -	0	0
12	FRANKLIN CO.	HARVIELAND	4/4/2008	Flash Flood	0	0	\$ 75,000.00	\$ -	0	0
13	FRANKLIN CO.	OTTUSVILLE	6/21/2010	Flash Flood	0	0	\$ -	\$ -	0	0
14	FRANKLIN CO.	HARVIELAND	4/23/2011	Flood	0	0	\$ -	\$ -	0	0
15	FRANKLIN CO.	BIG EDDY	5/3/2011	Flood	0	0	\$ -	\$ -	0	0
16	FRANKLIN CO.	JETT	7/6/2013	Flash Flood	0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	JETT	7/6/2013	Flash Flood	0	0	\$ -	\$ -	0	0
17	FRANKLIN CO.	HARVIELAND	6/19/2014	Flood	0	0	\$ -	\$ -	0	0

⁷ Source: National Centers for Environmental Information (NCEI) Storm Events database

Count	County	Location	Date	Type	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
18	FRANKLIN CO.	CHOATEVILLE	8/23/2014	Flood	0	0	\$ -	\$ -	0	0
19	FRANKLIN CO.	CLOVERDALE	9/11/2014	Flash Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	JETT	9/11/2014	Flash Flood	0	0	\$ -	\$ -	0	0
20	FRANKLIN CO.	CHOATEVILLE	4/3/2015	Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	4/3/2015	Flash Flood	0	0	\$ -	\$ -	0	0
21	FRANKLIN CO.	HARVIELAND	4/7/2015	Flash Flood	0	0	\$ 10,000.00	\$ -	0	0
22	FRANKLIN CO.	BENSON	7/28/2016	Flash Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FLAG FORK	7/28/2016	Flash Flood	0	0	\$ -	\$ -	0	0
23	FRANKLIN CO.	PEAKS MILL	3/1/2017	Flood	0	0	\$ -	\$ -	0	0
24	FRANKLIN CO.	BIG EDDY	6/23/2017	Flash Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FARMDALE	6/23/2017	Flash Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FLAG FORK	6/23/2017	Flash Flood	0	0	\$ -	\$ -	0	0
25	FRANKLIN CO.	PEAKS MILL	6/24/2017	Flood	0	0	\$ -	\$ -	0	0
26	FRANKLIN CO.	PEAKS MILL	2/22/2018	Flood	0	0	\$ -	\$ -	0	0
27	FRANKLIN CO.	PEAKS MILL	7/2/2018	Flash Flood	0	0	\$ -	\$ -	0	0
28	FRANKLIN CO.	BIG EDDY	8/11/2018	Flash Flood	0	0	\$ -	\$ -	0	0
29	FRANKLIN CO.	FARMDALE	11/6/2018	Flood	0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	11/6/2018	Flood	0	0	\$ -	\$ -	0	0
30	FRANKLIN CO.	CLOVERDALE	8/19/2021	Flash Flood	0	0	\$ -	\$ -	0	0
	TOTAL:				3	0	\$ 9,600,000.00	\$1,000,000.00	0	0

F. Franklin County, Unincorporated Probability (as a Function of Previous Occurrences)

First, in terms of identifying previous occurrences of flooding and flash-flooding for Franklin County and its unincorporated areas, this analysis relies upon the National Centers for Environmental Information (NCEI) and its Storm Events database that is populated with statistics from the National Weather Service (NWS). The reliance on this database is considered best-available data as it collects flooding and flash-flooding data systematically for all jurisdictions comprising the Bluegrass Area Development District and all data is collected by one federal agency, the National Weather Service.

Second, this analysis counts as a discrete flooding or flash-flooding event for Franklin County and its unincorporated areas only those events that occurred on different dates. Any event recorded that shares the same date of occurrence as other events are treated as one contiguous event.

The table above displays the entire record of flooding and flash-flooding events for Franklin County and its unincorporated areas contained within the NCEI Storm Events database. This analysis counts 30 discrete events within a date range that begins 1/1/1997 and ends (at the time of this writing) 11/30/2021.

Thus, this analysis assumes a 25-year period-of-record of flooding and flash-flooding events for Franklin County and its unincorporated areas. In terms of months, this analysis counts 299 months for the period-of-record.

To illustrate probability (as a function of previous occurrences) Franklin County and its unincorporated areas are counted as having 30 flooding or flash-flooding events over 25 years. This translates to 1.2 flooding or flash-flooding events per year. This statistic might be interpreted as assuming 100% probability that one flooding or flash-flooding event will occur within Franklin County and its unincorporated areas each year. So that the partial has meaning⁸, in terms of months and assuming uniformity in likelihood, Franklin County and its unincorporated areas can assume to have one (1) flooding or flash-flooding event approximately every ten (10) months⁹.

⁸ i.e., What is 1.2 flooding and flash-flooding events?

⁹ 30 events/299 months \approx 0.1003 events per month. 1 event/0.1003 events per month \approx 9.97009 months

Franklin County, Unincorporated Flooding and Flash-Flooding Types, Locations, Previous Occurrences, Impacts, and Extent

Franklin County, Unincorporated Flooding and Flash-Flooding Event with Narratives for Extent and Impacts, 1997-2021

Count	County	Location	Date	Type	Event Narrative
1	FRANKLIN (ZONE)		3/1/1997	Flood	
	FRANKLIN (ZONE)		3/1/1997	Flood	
	FRANKLIN CO.	COUNTYWIDE	3/1/1997	Flash Flood	
	FRANKLIN CO.	COUNTYWIDE	3/1/1997	Flash Flood	
2	FRANKLIN (ZONE)		3/2/1997	Flood	
3	FRANKLIN CO.	COUNTYWIDE	7/20/1998	Flash Flood	
4	FRANKLIN (ZONE)		3/20/2002	Flood	
5	FRANKLIN (ZONE)		2/17/2003	Flood	
6	FRANKLIN CO.	COUNTYWIDE	6/14/2003	Flash Flood	Several roadways over the northern half of the county were impassable. The roads included parts of Flat Creek Road, Bald Knob Road, and Highway 421. Some vehicles were stalled out in the flood waters. A propane tank dislodged and was floating on Bald Knob Road.
7	FRANKLIN CO.	HARVIELAND	8/22/2003	Flash Flood	A woman and her son were killed when their home was washed into Stony Creek, a tributary of the Kentucky River. Eight other homes were destroyed, and 32 others were damaged. Of the damaged homes, 21 were uninhabitable. Many vehicles were damaged and moved by the force of the flood waters. Several roads in the Harvieland and Bald Knob area northwest of Frankfort were washed out. Two school buses were trapped by high water in the area, but all aboard were rescued without injury.
8	FRANKLIN (ZONE)		5/31/2004	Flood	
9	FRANKLIN (ZONE)		6/1/2004	Flood	The Kentucky River at Frankfort crested at 35.8 feet late in the evening of March 21. Flood stage at Frankfort is 31 feet. Minor flooding occurs at this level. Parts of Kentucky 420 were flooded.
10	FRANKLIN CO.	BRIDGEPORT	1/10/2008	Flash Flood	Several roads were closed in Frankfort. Among them were Holmes Street, Old Lawrenceburg Road, and Cardwell Lane. U.S. Highway 127 south was down to one lane. Wilkerson Boulevard was covered by 8 inches of water.
	FRANKLIN CO.	CHOATEVILLE	1/10/2008	Flash Flood	Several roads in Frankfort were impassable. The Kentucky River at Frankfort was above flood stage and still rising at the end of May. Flood stage at Frankfort is 31 feet.
11	FRANKLIN CO.	JETT	3/19/2008	Flood	Slick away Road was closed due to high water.

Count	County	Location	Date	Type	Event Narrative
12	FRANKLIN CO.	HARVIELAND	4/4/2008	Flash Flood	A motorist drove into high water and was rescued. Other cars were abandoned in high water. Fifteen to twenty roadways were under water in the county. Some locations included Devils Hollow Bridge Road, Wilkinson Boulevard, and sections of Holmes Street.
13	FRANKLIN CO.	OTTUSVILLE	6/21/2010	Flash Flood	Several inches of water were flowing over Harp Pike and Flat Creek roads.
14	FRANKLIN CO.	HARVIELAND	4/23/2011	Flood	Several road closures were reported including one vehicle washed off the roadway on Bark Branch Rd. The humane society had to evacuate due to flooding.
15	FRANKLIN CO.	BIG EDDY	5/3/2011	Flood	Multiple roads were closed due to flooding including Big Eddy Rd. at 420 and the entrances to Two Creeks Subdivision. Also, Old Lawrenceburg Rd. from Todd St. to the east-west connector was closed due to a mud slide.
16	FRANKLIN CO.	JETT	7/6/2013	Flash Flood	The Frankfort media reported two different water rescues of drivers from their respective vehicles. One car was stalled in about 12 to 18 inches of water across Country Lane.
	FRANKLIN CO.	JETT	7/6/2013	Flash Flood	Heavy rains flooded and briefly closed the intersection of Country Lane and Saratoga Drive in Frankfort.
17	FRANKLIN CO.	HARVIELAND	6/19/2014	Flood	The Franklin County emergency manager reported that water covered the road in several spots along State Highway 421 northwest of Frankfort. The road was impassable in some places.
18	FRANKLIN CO.	CHOATEVILLE	8/23/2014	Flood	A spotter reported a stalled vehicle near State Highway 127 and Benson Creek. The ASOS site at the Frankfort Airport measured measured 1.64 inches of rain in one hour's time ending at 853 pm EDT. The Kentucky River at Frankfort had risen above flood stage near dawn on May 31. It crested at 34.4 feet around 1230 PM EST on June 1. Flood stage at Frankfort is 31 feet. Minor flooding occurs at this level. Water covered some low spots on Wilson Street in Bellepoint. State Highway 420 flooded one-half mile north of the East-West Connector.
19	FRANKLIN CO.	CLOVERDALE	9/11/2014	Flash Flood	State Highway 127 was briefly closed due to high water right in front of Hardee's. A portion of Evergreen Road was also closed. The ASOS site at nearby Frankfort airport measured around 2.4 inches in the 3 hours preceding this report.
	FRANKLIN CO.	JETT	9/11/2014	Flash Flood	A section of Duncan Road paralleling a creek was closed due to flash flooding.
20	FRANKLIN CO.	CHOATEVILLE	4/3/2015	Flood	Heavy rain brought the Kentucky River at Frankfort above flood stage, cresting at 36.15 feet during the early morning hours of April 4th.
	FRANKLIN CO.	PEAKS MILL	4/3/2015	Flash Flood	Emergency manager reported that Stillhouse Hollow Rd was closed due to water over the roadway. Between 5 and 7 inches of rain fell across the county. The Frankfort ASOS reported 5.27 inches that day.
21	FRANKLIN CO.	HARVIELAND	4/7/2015	Flash Flood	Department of Highway officials reported that a high-water rescue took place on O'nan Bend Rd as a car became submerged in high water.
22	FRANKLIN CO.	BENSON	7/28/2016	Flash Flood	Local law enforcement reported high water over Devils Hollow Road on the way toward Bagdad. The Kentucky River at Frankfort crested at 35.1 feet at 1215 AM EST on February 20. Flood stage at Frankfort is 31 feet. Minor flooding occurs at this level. Kentucky Highway 420 was flooded one half mile north of the East-West Connector. Water covered low spots in Wilson Street in Bellepoint.
	FRANKLIN CO.	FLAG FORK	7/28/2016	Flash Flood	Local law enforcement reported Bald Knob Road and Lebanon Road closed due to high water.
23	FRANKLIN CO.	PEAKS MILL	3/1/2017	Flood	The Elkhorn Creek at Peaks Mill crested above flood stage at 11.71 feet for a short duration.

Count	County	Location	Date	Type	Event Narrative
24	FRANKLIN CO.	BIG EDDY	6/23/2017	Flash Flood	Local law enforcement reported Big Eddy Road covered by 6 to 8 inches of high water.
	FRANKLIN CO.	FARMDALE	6/23/2017	Flash Flood	Local law enforcement reported that several roads, including Old Lawrenceburg Road, Green-Wilson Road, Evergreen Road, and Jones Lane were all covered with 6 to 8 inches of water flowing over.
	FRANKLIN CO.	FLAG FORK	6/23/2017	Flash Flood	Lebanon Ridge Road and Goose Creek Road both had 6 to 8 inches of flowing water.
25	FRANKLIN CO.	PEAKS MILL	6/24/2017	Flood	Heavy rainfall associated with the remnants of Tropical Storm Cindy brought the Elkhorn Creek at Peaks Mills into minor flood. The river crested at 10.26 feet.
26	FRANKLIN CO.	PEAKS MILL	2/22/2018	Flood	The Elkhorn Creek at Peaks Mill went into moderate flood. The river crested at 13.05 feet which was 3.05 feet above flood stage on February 23.
27	FRANKLIN CO.	PEAKS MILL	7/2/2018	Flash Flood	Part of Camp Pleasant Road was closed due to high water.
28	FRANKLIN CO.	BIG EDDY	8/11/2018	Flash Flood	Significant flooding reporting on Interstate 64 eastbound near the Kentucky River.
29	FRANKLIN CO.	FARMDALE	11/6/2018	Flood	Avenstoke Road near the county line was closed due to high water from a creek.
	FRANKLIN CO.	PEAKS MILL	11/6/2018	Flood	Stillhouse Hollow Road, along Elkhorn Creek, was closed due to high water.
30	FRANKLIN CO.	CLOVERDALE	8/19/2021	Flash Flood	Highway 127 flooded between Goodyear and Bojangles.

City of Frankfort Flooding and Flash Flooding Events, 1997-2021¹⁰

Count	County	Location	Date	Type	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN CO.	FRANKFORT	5/24/2004	Flash Flood	0	0	\$ -	\$ -	0	0
2	FRANKLIN CO.	FRANKFORT	5/30/2004	Flash Flood	0	0	\$ -	\$ -	0	0
3	FRANKLIN CO.	FRANKFORT	7/14/2006	Flash Flood	0	0	\$ -	\$ -	0	0
4	FRANKLIN CO.	FRANKFORT	9/23/2006	Flash Flood	1	0	\$ -	\$ -	0	0
5	FRANKLIN CO.	FRANKFORT	8/4/2009	Flash Flood	0	0	\$ -	\$ -	0	0
6	FRANKLIN CO.	FRANKFORT	5/2/2010	Flash Flood	0	0	\$ 5,000.00	\$ -	0	0
7	FRANKLIN CO.	FRANKFORT	5/3/2010	Flood	0	0	\$ 1,000,000.00	\$ -	0	0
8	FRANKLIN CO.	FRANKFORT	6/23/2017	Flash Flood	0	0	\$ -	\$ -	0	0
9	FRANKLIN CO.	FRANKFT CPTL CITY AR	8/18/2018	Flash Flood	0	0	\$ -	\$ -	0	0
10	FRANKLIN CO.	FRANKFORT	11/5/2018	Flood	0	0	\$ -	\$ -	0	0
	TOTAL				1	0	\$ 1,005,000.00	\$ -	0	0

¹⁰ Source: National Centers for Environmental Information (NCEI) Storm Events database

G. City of Frankfort Probability (as a Function of Previous Occurrences)

First, in terms of identifying previous occurrences of flooding and flash-flooding for City of Frankfort, this analysis relies upon the National Centers for Environmental Information (NCEI) and its Storm Events database that is populated with statistics from the National Weather Service (NWS). The reliance on this database is considered best-available data as it collects flooding and flash-flooding data systematically for all jurisdictions comprising the Bluegrass Area Development District and all data is collected by one federal agency, the National Weather Service.

Second, this analysis counts as a discrete flooding or flash-flooding event for City of Frankfort only those events that occurred on different dates. Any event recorded that shares the same date of occurrence as other events are treated as one contiguous event.

The table above displays the entire record of flooding and flash-flooding events for City of Frankfort contained within the NCEI Storm Events database. This analysis counts ten (10) discrete events within a date range that begins 1/1/1997 and ends (at the time of this writing) 11/30/2021.

Thus, this analysis assumes a 25-year period-of-record of flooding or flash-flooding events for City of Frankfort. In terms of months, this analysis counts 299 months for the period-of-record.

To illustrate probability (as a function of previous occurrences) City of Frankfort are counted as having ten (10) flooding and flash-flooding events over 25 years. This translates to 0.4 flooding or flash-flooding events per year. So that the partial has meaning¹¹, in terms of months and assuming uniformity in likelihood, City of Frankfort can assume to have one (1) flooding or flash-flooding event approximately every 30 months¹².

¹¹ i.e., What is 0.4 flooding or flash-flooding events per year?

¹² 10 events/299 months \approx 0.03344 events per month. 1 event/0.03344 events per month \approx 29.9043 months

City of Frankfort Flooding and Flash-Flooding Types, Locations, Previous Occurrences, Impacts, and Extent

City of Frankfort Flooding and Flash-Flooding Events with Narratives for Extent and Impacts, 1997-2021

Count	County	Location	Date	Type	Event Narrative
1	FRANKLIN CO.	FRANKFORT	5/24/2004	Flash Flood	Flag Fork Road off Highway 421 was washed out.
2	FRANKLIN CO.	FRANKFORT	5/30/2004	Flash Flood	Some streets were flooded in the city.
3	FRANKLIN CO.	FRANKFORT	7/14/2006	Flash Flood	U.S. Highway 421 in southeast Franklin County was flooded in spots.
4	FRANKLIN CO.	FRANKFORT	9/23/2006	Flash Flood	Several roads were closed due to high water. A female drowned in her vehicle which was found in a creek in the Avenstoke Road area.
5	FRANKLIN CO.	FRANKFORT	8/4/2009	Flash Flood	Numerous roads were flooded in the county. They included Camp Pleasant Road and Seeder Road in the Peaks Mill area. There was a high-water rescue on Oklahoma Branch road.
6	FRANKLIN CO.	FRANKFORT	5/2/2010	Flash Flood	A couple of county roads were temporarily obstructed by debris and rocks from water flowing over the roads.
7	FRANKLIN CO.	FRANKFORT	5/3/2010	Flood	The Kentucky River at Frankfort crested at 42.8 feet around 7 PM EST on May 4. Flood stage at Frankfort is 31 feet. Major flooding occurs at this level with basements of homes and businesses in downtown Frankfort flooded. The Bellepoint area was cut off by high water.
8	FRANKLIN CO.	FRANKFORT	6/23/2017	Flash Flood	Meadowbrook Road was covered by 6 to 8 inches of high flowing water.
9	FRANKLIN CO.	FRANKFORT CPTL CITY AR	8/18/2018	Flash Flood	Emergency management reported flooding on Holly Hill Drive. Social media reports showed several feet of water in yards in that area.
10	FRANKLIN CO.	FRANKFORT	11/5/2018	Flood	Rolling Acres Drive was closed due to flooding.

National Flood Insurance Program (NFIP) Participation

CID	Community Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date
210280C	Franklin County	Franklin County	6/17/1977	9/30/1981	12/21/2017	9/30/1981
210075C	Frankfort, City of	Franklin County	6/7/1974	7/2/1981	12/21/2017	7/2/1981

Both Franklin County, Unincorporated and the City of Frankfort are participants in good standing with the National Flood Insurance Program (NFIP).

Community Rating System (CRS) Participation

CID	Community Name	County	CRS Entry Date	Curr Eff Date	Curr Class
210280C	Franklin County	Franklin County	5/1/2013	5/1/2013	8
210075C	Frankfort, City of	Franklin County	10/1/1992	5/1/2010	8

Additionally, both Franklin County, Unincorporated and the City of Frankfort participate in the Community Rating System (CRS). Both have been designated “Class 8” communities. Through the jurisdictions’ actions in implementing policies and “activities” and documenting such implementation, the residents of both Franklin County, Unincorporated and the City of Frankfort receive a 10% premium discount for all flood insurance policies within the Special Flood Hazard Area (SFHA) and receive a 5% premium discount for all flood insurance policies that are not in the Special Flood Hazard Area (SFHA).

Repetitive-Loss and Severe Repetitive-Loss Properties

Franklin County, Unincorporated possesses seventeen (17) Repetitive-Loss (RL) and/or Severe Repetitive-Loss (SRL) properties. There are two (2) definitions for “Repetitive-Loss” and there are two (2) definitions for “Severe Repetitive-Loss”: There are the National Flood Insurance Program (NFIP) program definitions of “Repetitive-Loss” and “Severe Repetitive-Loss” and there are the Flood Mitigation Assistance (FMA) definitions of “Repetitive-Loss” and “Severe Repetitive-Loss.”

The following table summarizes how many properties are characterized by a “type” of property (i.e., whether “single-family occupancy,” “2-4 family occupancy,” or “other non-residential”) and summarizes within each type the number considered “Repetitive-Loss” under the NFIP and FMA definitions and the number considered “Severe Repetitive-Loss” according to the NFIP and FMA definition. The 17 properties in Franklin County, Unincorporated are disaggregated as follows:

Franklin County, Uninc., RL and SRL Properties by Type and by RL/SRL Definition Category

Jurisdiction	Type	Number of Type	NFIP RL	FMA RL	NFIP SRL	FMA SRL
Franklin County	Single-Family Occupancy	12	12	5	8	9
Franklin County	2-4 Family Occupancy	2	2	0	2	2
Franklin County	Other Non-Residential	3	3	1	2	3
TOTAL		17	17	6	12	14

The City of Frankfort possesses nineteen (19) Repetitive-Loss (RL) and/or Severe Repetitive-Loss (SRL) properties. There are two (2) definitions for “Repetitive-Loss” and there are two (2) definitions for “Severe Repetitive-Loss”: There are the National Flood Insurance Program (NFIP) program definitions of “Repetitive-Loss” and “Severe Repetitive-Loss” and there are the Flood Mitigation Assistance (FMA) definitions of “Repetitive-Loss” and “Severe Repetitive-Loss.”

The following table summarizes how many properties are characterized by a “type” of property (i.e., whether “single-family occupancy,” “2-4 family occupancy,” or “other non-residential”) and summarizes within each type the number considered “Repetitive-Loss” under the NFIP and FMA definitions and the number considered “Severe Repetitive-Loss” according to the NFIP and FMA definition. The 17 properties in City of Frankfort are disaggregated as follows:

City of Frankfort RL and SRL Properties by Type and by RL/SRL Definition Category

Jurisdiction	Type	Number of Type	NFIP RL	FMA RL	NFIP SRL	FMA SRL
Frankfort, City of	Single-Family Occupancy	11	9	1	9	11
Frankfort, City of	2-4 Family Occupancy	2	2	0	2	2
Frankfort, City of	Other Non-Residential	6	6	0	6	6
TOTAL		19	17	1	17	19

A Statement of Vulnerability to Flooding for Franklin County and the City of Frankfort

From the City of Frankfort’s website, the following relevant statement regarding vulnerability to flooding for both Franklin County and the City of Frankfort is made¹³:

“Much of Franklin County is comprised of two (2) 100-year [i.e., 1% Annual Chance] floodplains; Elkhorn Creek and the Kentucky River floodplain.

“Flash-flooding is the general type of flooding caused by Elkhorn, Benson, and other Creeks. During a normal flood event, two to four (2-4) inches of rain in a three to four (3-4) hour time period jeopardizes the Creek banks and overflows.

“Flooding on the Kentucky River is normally a much slower event, and can be caused by rain south and east of us as it makes its way down the river for eventual discharge into the Ohio River.

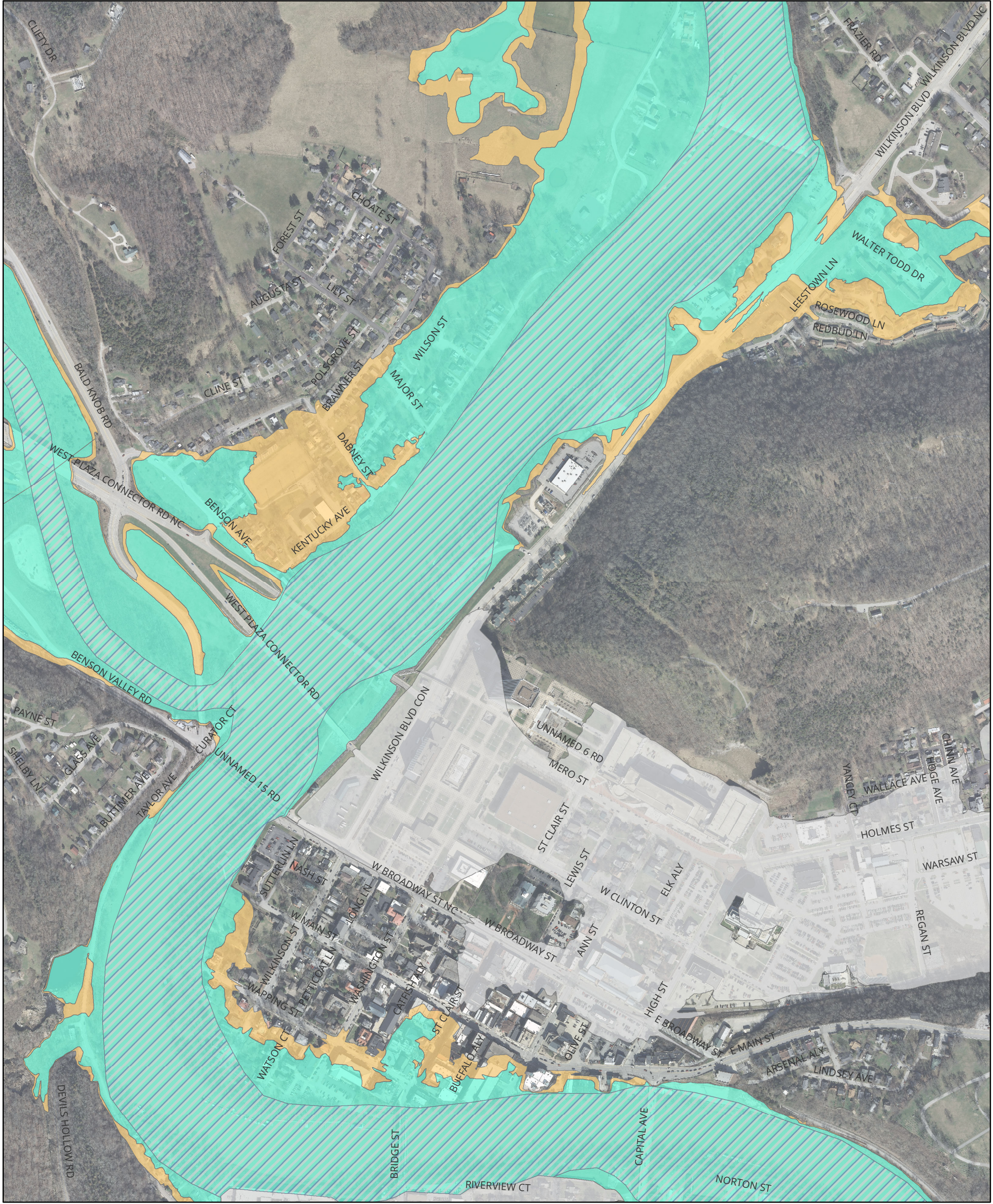
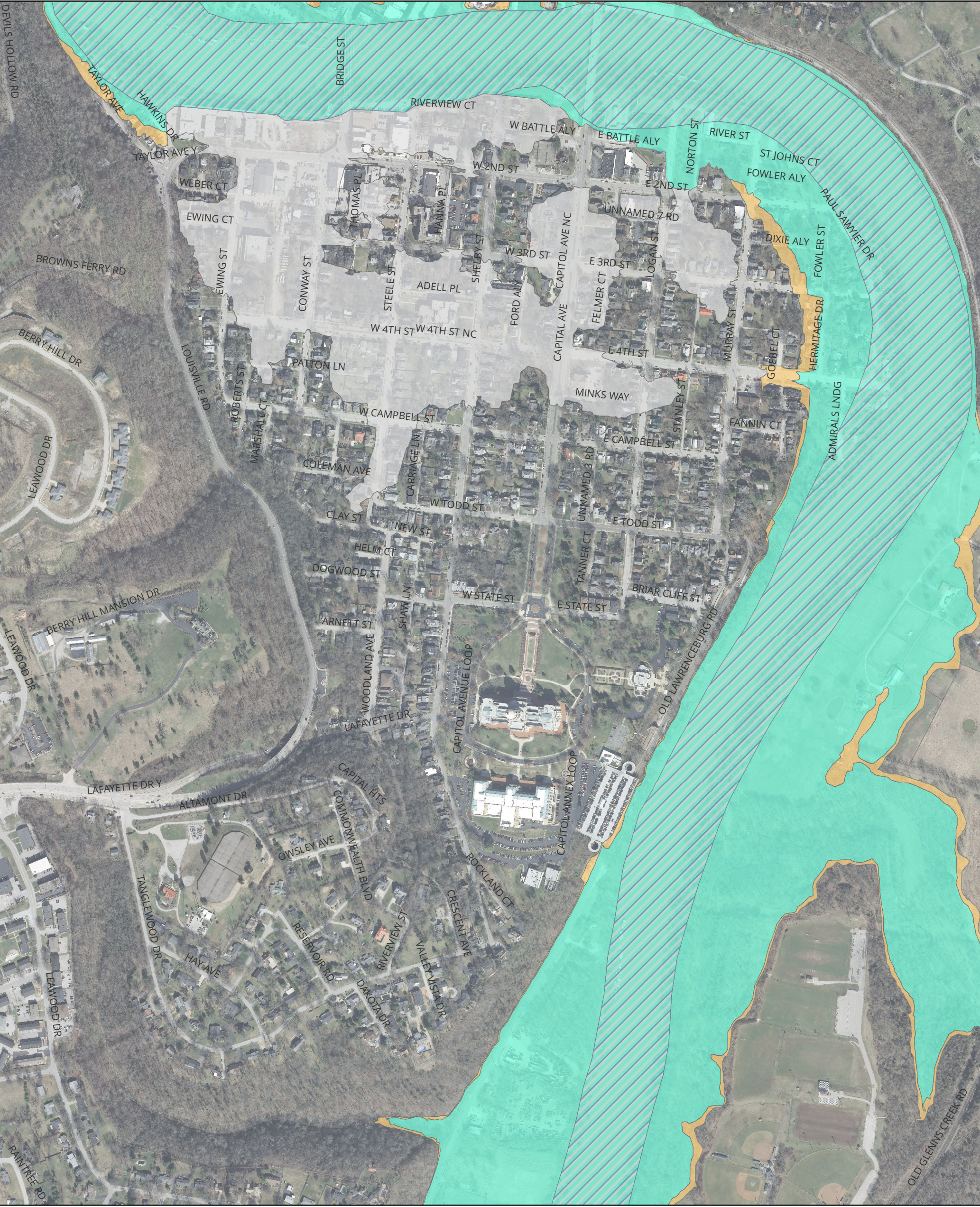
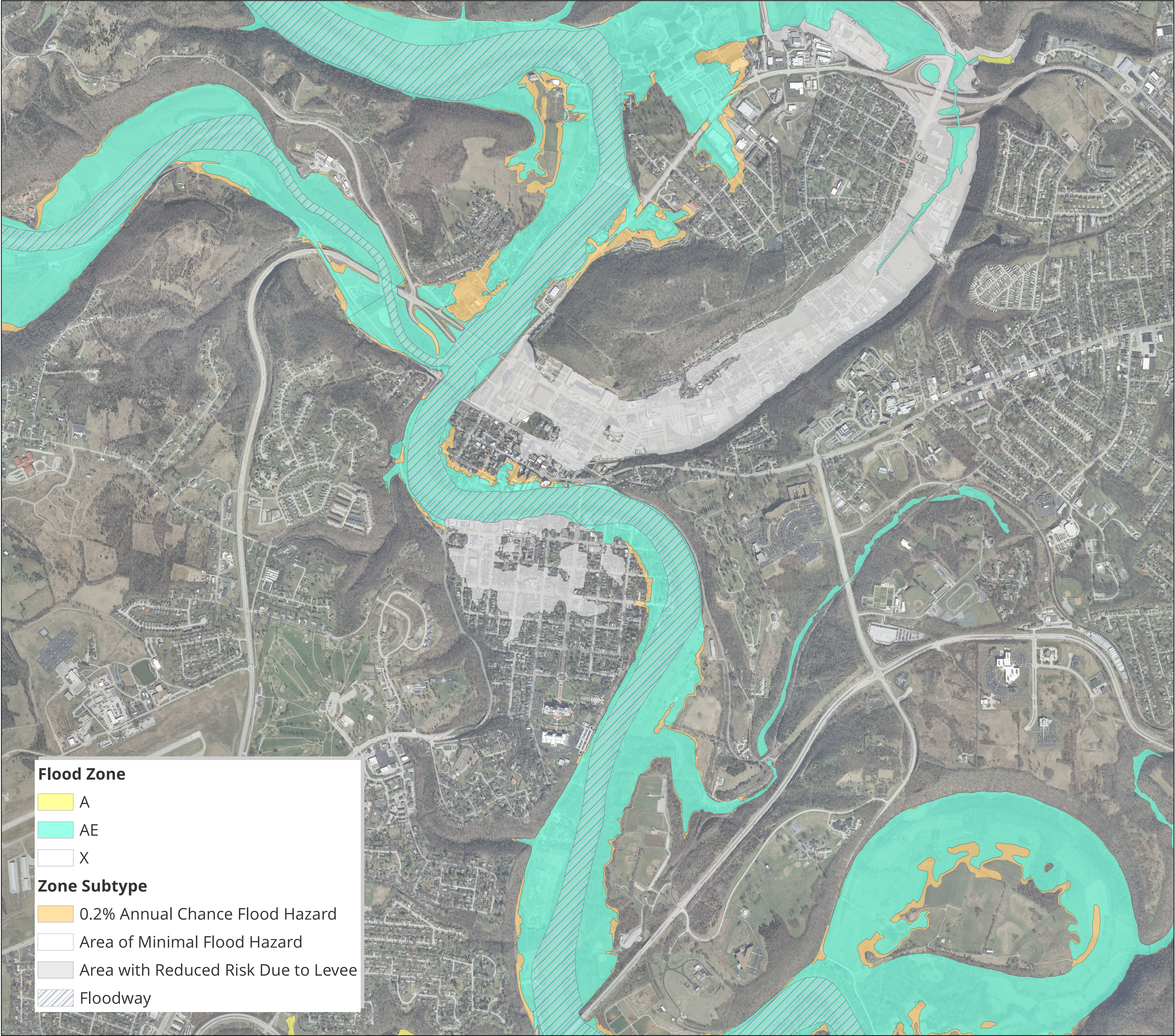
“Various floods from the Kentucky River have hit Frankfort and Franklin County in recent memory. In 1978 and 1997 floodwaters reached into many residences as well as business storefronts and basements.”

Additionally, on the next page is a map of Franklin County and the City of Frankfort’s flood zones that, again, can be found on the City of Frankfort’s website¹⁴.

¹³ See <https://franklincounty.ky.gov/fc-flood-info/>. Additionally, there is a link on this webpage that directs to a brochure that goes into more detail: https://franklincounty.ky.gov/wp-content/uploads/2018/11/2017-Flood-Information-Brochure_v2.pdf.

¹⁴ See <https://www.frankfort.ky.gov/187/City-Maps>.

Flood Zones - Frankfort, Kentucky



Dams

A. New and Existing Dams

Depending on the type of dam, periodic inspections are performed during the construction of a new dam. A final inspection is performed when the construction is complete and as-built drawings are submitted. If the dam is constructed according to the plans and specifications, a letter is issued approving the impounding of water. The dam is then added to the inventory database.

B. Signs of Potential Dam Failure

Seepage: The appearance of seepage on the downstream slope, abutments, or downstream area is cause for concern. If the water is muddy and is coming from a well-defined hole, material is probably being eroded from inside the embankment and a potentially dangerous situation can develop.

Erosion: Erosion on the dam and spillway is one of the evident signs of danger. The size of erosion channels and gullies can increase greatly with slight amounts of rainfall.

Cracks: Cracks are one of two types: traverse or longitudinal. Traverse cracks appear perpendicular to the axis of the dam and indicate settlement of the dam. Longitudinal cracks run parallel to the axis of the dam and may be the signal for a slide, or slump on either face of the dam.

Subsidence: Subsidence is the vertical movement of the foundation materials due to failure of consolidation. The rate of subsidence may be so slow that it can go unnoticed without proper inspection. Foundation settlement is the result of placing the dam and reservoir on an area not having suitable strength or over collapsed caves or mines.

Structural: Conduit separations or ruptures can result in water leaking into the embankment and subsequent weakening of the dam. Pipe collapse can result in hydraulic failures due to diminished capacity.

Vegetation: A prominent danger signal is the appearance of “wet environment” types of vegetation such as cattails, reeds, mosses, and other wet area vegetation. Appearance of these types of vegetation can be a sign of seepage.

Boils: Boils indicate seepage water exiting under some pressure and typically occur in areas downstream of the dam.

Animal Burrows: Animal Burrows are a potential danger since such activity can undermine the structural integrity of the dam.

C. Types of Dam Failures

Dam failures generally result from a complex interrelationship of several failure modes. Uncontrolled seepage may weaken the soils and lead to a structural failure. Structural failure may shorten the seepage path and lead to piping failure. Surface erosion may lead to structural piping failures.

Hydraulic Failure. Hydraulic failures result from the uncontrolled flow of water over, around the dam and/or adjacent to the dam, and the erosive action of water on the dam and its foundation. Earth dams are particularly vulnerable to hydraulic failure since earth erodes at relatively small velocities.

Seepage Failure. All dams exhibit some seepage that must be controlled in velocity and amount. Seepage can occur through the dam and its foundation. If uncontrolled, it can erode material from the foundation of an earth dam to form a conduit through which water can pass. This passing of water often leads to a complete failure of the structure known as piping.

Structural Failure. Structural failures involve the rupture of the dam and/or its foundation. This is particularly hazard for large dams and for dams built of low strength materials such as silts, slag, fly ash, etc.

D. Dam Impacts

Dam failures cause flooding that is significantly different from natural flooding. A flood from a dam failure may arrive before any warning or evacuation based on limited environmental cues occur making it very problematic. The failure of large dams results in flooding with enough energy to damage or destroy residences and other structures.

Karst

An area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns. Karst refers to a type of topography formed in limestone, dolomite, or gypsum by dissolution of these rocks by rain and underground water, and is characterized by closed depressions or sinkholes, and underground drainage. During the formation of karst terrain, water percolating underground enlarges subsurface flow paths by dissolving the rock. As some subsurface flow paths are enlarged over time, water movement in the aquifer changes character from one where ground water flow was initially through small, scattered openings in the rock to one where most flow is concentrated in a few, well developed conduits. As the flow paths continue to enlarge, caves may be formed, and the ground water table may drop below the level of surface streams. Surface streams may then begin to lose water to the subsurface. As more of the surface water is diverted underground, surface streams and valleys become a less conspicuous feature of the land surface and are replaced by closed basins. Funnels or circular depressions called sinkholes often develop at some places in the low points of these closed.

A. Sinkholes

A sinkhole is a natural depression in a land surface communicating with a subterranean passage, generally occurring in limestone regions, and formed by solution or by the collapse of a cavern roof.

A karst landscape has sinkholes, sinking streams, caves, and springs. Precipitation infiltrates into the soil and flows into the subsurface from higher elevations and generally toward a stream at a lower elevation. Weak acids found naturally in rain and soil water slowly dissolve the tiny fractures in the soluble bedrock, enlarging the joints and bedding planes.

B. Sinkhole Types

1. **Collapse Sinkholes:** Occur when the bridging material over a subsurface cavern cannot support the overlying material. The cover collapses into the cavern and a large, funnel-shaped depression forms.
2. **Solution Sinkholes:** Results from increased groundwater flow into higher porosity zones within the rock, typically through fractures or joints within the rock. An increase of slightly acidic surface water into the subsurface continues to slow dissolution of the rock matrix, resulting in slow subsidence as surface materials fill the voids.
3. **Alluvial Sinkholes:** Older sinkholes that have been partially filled with marine, wetland or soil sediments. These features are common in low lying coastal areas, where the water table is shallow, and typically appear as shallow lakes and wetlands.
4. **Raveling Sinkholes:** Form when a thick overburden of sediment over a deep cavern cave into the void and pipes upward toward the surface. As the overlying material or “plug” erodes into the cavern, the void migrates upward until the cover can no longer be supported then subsidence begins.

C. Sinkhole Potential Loss and Probability

The lack of proper data prohibits accurate loss estimation modeling, on jurisdictions, for the karst hazard. There is not enough data available to adequately detail what potential losses may occur from karst. That said, it is assumed given Franklin County and the City of Frankfort’s location within the Inner Bluegrass Karst Area (see below) that there is near a 100% chance of a sinkhole event occurring somewhere within the county and/or city. That there are no systematic damages is a function of ubiquity of events.

D. Sinkhole Vulnerability

In the meeting that was held with the public and the local emergency management stakeholders, karst was rated as posing a low risk to Franklin County. Because Franklin County is located near one of the most severe karst regions in the state, the Bluegrass ADD planning staff would argue that it likely poses a moderate rather than low risk. Franklin County has also seen several large sinkholes form within the county in recent years. In 2015 a sinkhole forced a busy street in Frankfort to close. A portion of the pavement collapsed below the intersection of Shelby Street and 4th Street in Downtown Frankfort¹⁵. Another large sinkhole that is located outside of the City of Frankfort in rural Franklin County is even featured on a list of “9 Sinkholes That Will Leave You Terrified of Earth”.

¹⁵ Source: WTVQ

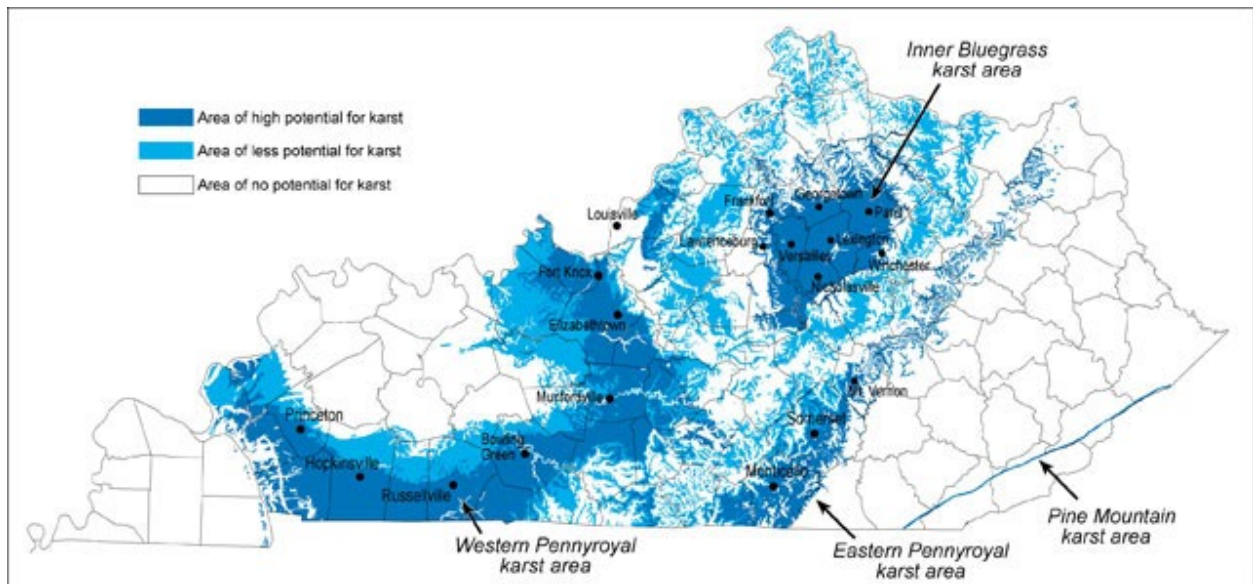


Figure 1: Kentucky Karst Topography, Source: Kentucky Geological Survey



Figure 2: Large Sinkhole in Rural Franklin County

Landslides

According to the Kentucky Geological Survey, landslides are the downslope movement of rock, soil, or both under the influence of gravity. They can occur in landscapes ranging from gentle slopes to steep cliffs. Velocity of landslide movement can also vary from slow to very rapid.

Landslides occur in each of the 50 states. In Kentucky, they are not isolated to a particular region within the state, as all that is required is gravity to exceed the strength of the materials that compose a slope.

Landslides can be triggered or facilitated by intense rainfall, earthquakes, water level change, human activities, and geology. Areas that are generally prone to landslide hazards include existing old landslides; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used.

Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes. Federal, state, and local agencies responsible for disaster assistance, flood insurance, and highway maintenance and repair incur much of the economic loss. Private costs involve mainly damage to land and structures. A severe landslide can result in financial ruin for the property owners because landslide insurance (except for disease flow coverage) or other means of spreading the costs of damage are unavailable. Since the early 1970s, the Kentucky Transportation Cabinet and the Kentucky Transportation Center has received reports of approximately 3,000 landslides. The cost for landslide damage repair has exceeded \$2 million annually. Thousands of slides are unrelated to transportation, however, and remain unreported. Landslides are also significant hazards to people and infrastructure.

Population increases, rapid urbanization, and development will lead to an increase in landslide activity. The direct costs of a landslide can include repair and maintenance of roads and property. The indirect costs result in a loss of tax revenue on property devalued because of landslides, loss of real estate value in landslide-prone areas, and environmental effects such as water quality. In addition, indirect cost can result in lost productivity, disruption of utility and transportation systems, and costs for any litigation. Some indirect costs are difficult to evaluate, thus estimates are usually conservative or simply ignored. If indirect costs were realistically determined, they likely would exceed direct costs.

A. Historical Landslide Data for the Region

See table on following page(s)

Franklin County and the City of Frankfort Landslide Previous Occurrences, Types, Locations, Extent, Impacts from Kentucky Geological Survey Landslide Inventory, 2011¹⁶ - January 2022

Count	County	City	Latitude	Longitude	Location: Site	Location: Failure Location	Failure Date	Type	Extent: Track Length	Extent: Width	Extent: Slip Surface Depth	Type: Lithology	Impact: Damage	Impact: Cost
1	Franklin	Frankfort East	38.168867	84.869163	KY 1263	General Road, Embankment; Stream at Bottom	2011					Limestone		N/A ¹⁷
2	Franklin	Frankfort East	38.169087	84.869163	KY 1263	General Road Embankment; Stream at Bottom	2011					Limestone		N/A
3	Franklin	Frankfort East	38.186547	84.871346	KY 420	Below Road	3/17/2011	Landslide				Limestone	Break in Pavement: Road Embankment Failure along Kentucky River	N/A
4	Franklin	Frankfort East	38.16875	84.872674	KY 1263	Below Road; Stream at Bottom	4/25/2011	Landslide				Limestone	Yes: Arcuate Cracks in Road; Steep Scarp in Road; Road Closed; Home Threatened	N/A
5	Franklin	Frankfort East	38.16875	84.868355	KY 1263 Big Eddy Rd		4/28/2011	Landslide				Limestone	Yes: Road Slumping Out Toward River; House Threatened	N/A
6	Franklin	Switzer	38.278885	84.868355	KY 1262		4/28/2011	Rockfall				Limestone		N/A
7	Franklin	Frankfort East	38.168816	84.793421	KY 1263 Big Eddy Rd	Above and Below Road; Stream at Bottom	5/3/2011	Landslide				Limestone	Yes	N/A
8	Franklin	Frankfort West	38.172444	84.871027	US 420	Above Road	5/3/2011	Landslide				Limestone	Yes: Road Closed	N/A
9	Franklin	Franklin West	38.199906	84.877056	KY 1211	Below Road; Stream at Bottom	6/1/2011	Landslide				Limestone	Yes: Both Lanes Blocked Due to Collapse	N/A
10	Franklin	Frankfort East	38.22248	84.884674	KY 1689	Above Road; Stream at Bottom	10/10/2014	Landslide				Limestone	Yes: Trees slid downslope; Damaged utility	N/A

¹⁶ The events that are not dated (i.e., have nothing in the “Failure Date” column) may have failed prior to 2011.

¹⁷ “N/A” here refers to “Not Available” instead of Not Applicable.”

Count	County	City	Latitude	Longitude	Location: Site	Location: Failure Location	Failure Date	Type	Extent: Track Length	Extent: Width	Extent: Slip Surface Depth	Type: Lithology	Impact: Damage	Impact: Cost
													poles; Road closure	
11	Franklin	Frankfort West	38.217184	84.895274	US 421	Above Road	2/12/2015	Rockfall				Limestone and Minor Shale	Road Blocked	N/A
12	Franklin	Frankfort East	38.186954	84.872351	KY 420	Below Road; Stream at Bottom	2016	Landslide				Limestone	Embankment Failure; Road Collapse; Multiple Repeated Failures in This Area	N/A
13	Franklin	Frankfort East	38.186713	84.794105	US 421	Above Road		Landslide	40'			Limestone	Embankment Failure: Slump/Flow in Road Embankment	N/A
14	Franklin	Frankfort East	38.186239	84.872888	KY 420									N/A
15	Franklin	Frankfort East	38.169315	-84.87263	KY 1263									N/A
16	Franklin	Frankfort East	38.167695	-84.87263	KY 1659							Limestone and Shale		N/A
17	Franklin	Frankfort East	38.159901	84.854832	KY 1659	Below Road; Stream at Bottom		Landslide		60'	21.7' (Average Depth of Weathered Rock)	Limestone		N/A
18	Franklin	Frankfort East	38.160883	-84.85081	KY 1659	Below Road; Stream at Bottom		Landslide		40'	18.3' (Average Depth of Weathered Rock)	Limestone		N/A
19	Franklin	Frankfort East	38.167615	84.850882	KY 1659	Below Road		Landslide	35'-40'	60'		Clay, Silt, Gravel, and Sand	Yes	N/A
20	Franklin	Frankfort East	38.169787	84.855009	KY 1681	Above Road		Rockfall				Calcarenite		N/A
21	Franklin	Frankfort West	38.201489	-84.81298	KY 1211	Below Road; Stream at Bottom		Landslide				Limestone	Yes: Shallow Bank Failure into Kentucky River	N/A
22	Franklin	Frankfort West	38.200884	-84.88373	KY 1211	Below Road; Stream at Bottom		Landslide				Limestone	Yes: Shallow Bank Failure into Kentucky River	N/A

Count	County	City	Latitude	Longitude	Location: Site	Location: Failure Location	Failure Date	Type	Extent: Track Length	Extent: Width	Extent: Slip Surface Depth	Type: Lithology	Impact: Damage	Impact: Cost
23	Franklin	Frankfort West	38.197351	-84.88455	KY 1211	Above Road		Landslide				Limestone	Yes	N/A
24	Franklin	Frankfort West	38.20512	84.876525	US 127								Yes: Affected Riverview Apartments	N/A
25	Franklin	Frankfort West	38.228233	-84.93191	KY 1570 (St. John's Road)									N/A
26	Franklin	Frankfort West	38.228955	84.928576	KY 1570 (St. John's Road)									N/A
27	Franklin	Frankfort West	38.221046	84.911868	US 421									N/A
28	Franklin	Frankfort West	38.204997	84.883831	KY 1211									N/A
29	Franklin	Frankfort West	38.207212	84.886428	US 127									N/A
30	Franklin	Frankfort West	38.221112	84.912005	US 421	Below Road		Landslide				Limestone and Shale, Interbedded, Minor Siltstone	Yes	N/A
31	Franklin	Frankfort West	38.317218	-84.9494	US 421	Below Road		Landslide				Limestone and Shale, Interbedded, Minor Siltstone	Yes	N/A
32	Franklin	Polsgrove	38.317168	-84.94949	US 421									N/A
33	Franklin	Polsgrove	38.272743	84.943988	US 421									N/A
34	Franklin	Polsgrove	38.27276	84.944062	US 421									N/A
35	Franklin	Switzer	38.299233	84.811509	KY 1262									N/A

Probability for Landslides as a Function of Previous Occurrences

First, it is relevant to note that the landslide events recorded above for which there is no value in the “Failure Date” column may have failed prior to 2011. Frankly, they may have failed years or decades prior to 2011. Still, Kentucky suffers from dramatic underreporting of landslides. So, a way to correct this underreporting and to illustrate the risk from landslides for Franklin County and for the City of Frankfort (that comprises most of the vulnerability to landslides), when discussing probability of future landslide occurrence in terms of frequency of occurrence (i.e., as a function of recorded previous occurrences) this analysis assumes it more accurate to compact the date range for previous occurrences (thus making the denominator smaller and the per annum landslide frequency larger) than elongate the date range. Over the entire span of time for which landslides could be or should have been recorded in a fantastical world where recording a landslide event is as quotidian as picking up one’s mail, there are far more than 35 total previous occurrences. Represented above is the best available data.

Assuming, then, a date ranges from (an assumed January of) 2011 to the end of December 2021, in total for both Franklin County and for the City of Frankfort there have been 35 landslide/slide/rockfall events recorded over eleven (11) years or 132 months.

So, for all of Franklin County and the City of Frankfort, one may logically expect approximately 3 landslide events per year (3.18 per year, or $35/11$). Of course, in terms of months, for all of Franklin County and the City of Frankfort, one may expect a landslide event to occur approximately once every four months (once every 3.77 months, or $[1/(35/132)]$).

Breaking out the City of Frankfort from Franklin County, unincorporated, there are 30 recorded events in the City of Frankfort and five (5) recorded landslide events in Franklin County, unincorporated. This changes the frequency-cum-probability as follows:

- Franklin County, Unincorporated had recorded five (5) events over 11 years, or 0.45 events per year, or one (1) event every 2.22 years (i.e., one event every two years and about 3 months (2.64 months))
 - o Franklin County, Unincorporated had recorded five (5) events over 132 months, or one (1) event every 26.4 months $[1/(5/132)]$.
- The City of Frankfort had recorded 30 events over 11 years, or 2.72 events per year.
 - o The City of Frankfort had recorded 30 events over 132 months, or 0.2272 events per month, or one (1) event every 4.4 months $[1/(30/132)]$.

Vulnerability to Landslides

The following statement of methodology describing what will be an illustration of the vulnerability to landslides for Franklin County and the City of Frankfort derives from the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018:

Regarding susceptibility, “[a] statewide landslide susceptibility model was developed in ArcGIS using two map layers: geology and slope. The geology and slope maps (raster images) were reclassified based on a matrix of weighted scores that were assigned to particular geologic formations and ranges of slope values (Table 2-5). The weighted score for slope doubled with each increasing slope range. The weighted score for the geology ranged from 10 to 40 depending on the rock type. Using the ArcGIS Weighted Sum tool, the newly reclassified values of both raster map layers were multiplied by an assigned weight and then values for both layers were added together (Eq. 2-1). In order to have slope be a greater influence on the susceptibility model, a 70 percent weight was assigned for slope and a 30 percent weight was assigned for geology.

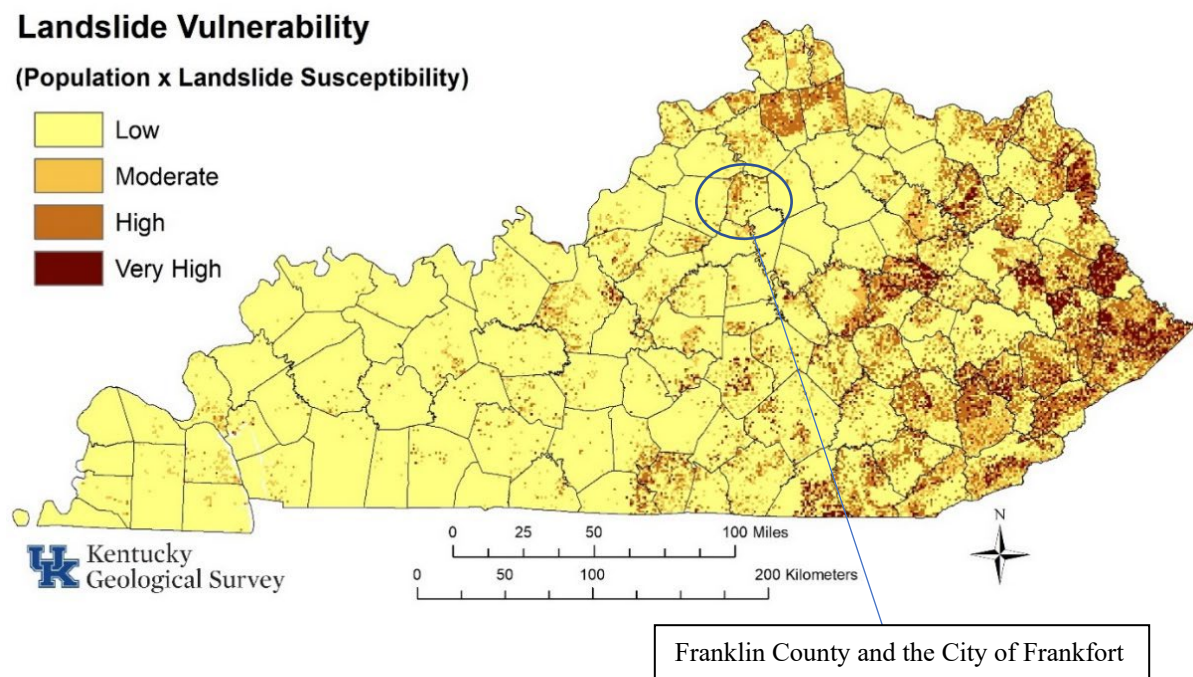
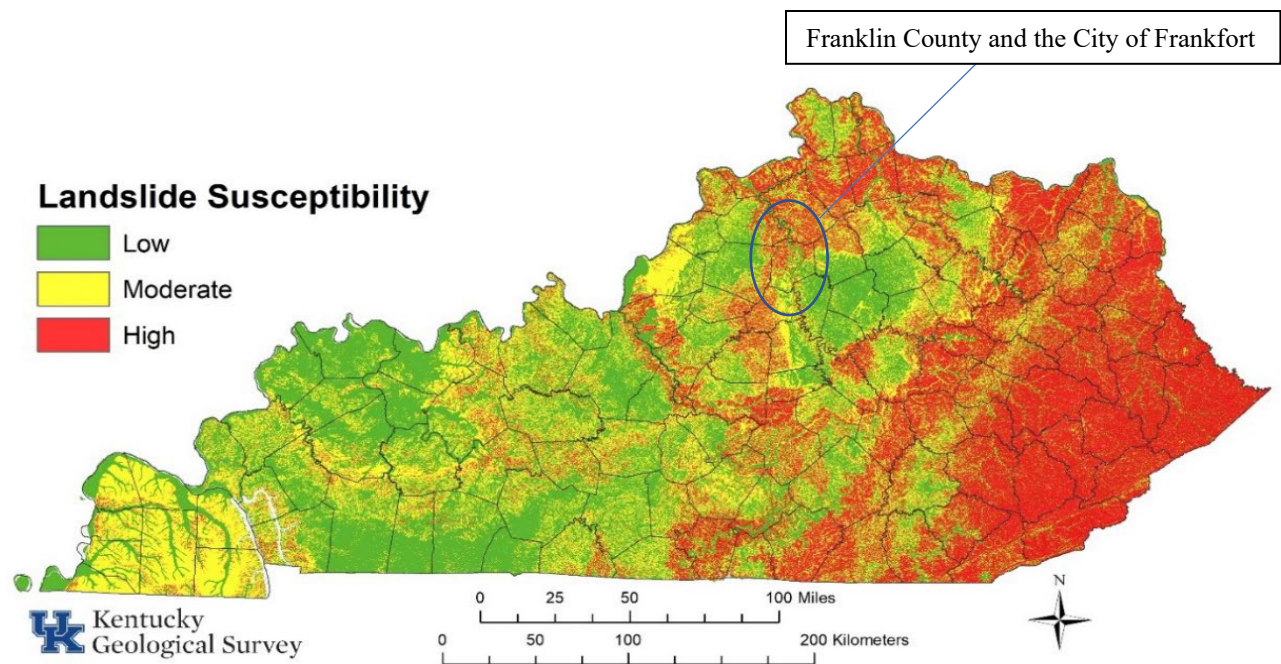
“Eq. 2-1

(geology reclass value × 0.30) + (slope reclass value × 0.70) = landslide susceptibility value

“Using the summed cell values from the two layers, landslide susceptibility was manually classified into low, moderate, and high categories.... Classification was made by visually inspecting the map and by determining the distribution of existing landslides cataloged in the Kentucky Geological Survey inventory.”

Regarding vulnerability, “[a] landslide vulnerability map was created to identify specific areas where impact from landslide activity may be significant because of exposure... U.S. Census Bureau census tract population data and the landslide susceptibility values were used to create the map. Using the ArcGIS Raster Calculator, the vulnerability values were calculated by multiplying population by the weighted landslide susceptibility score. Vulnerability was classified as low, moderate, high, or very high based on population, topography, and the distribution of landslides listed in the inventory¹⁸.”

¹⁸ See pages KGS-27 – KGS-28 in the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018.



Severe Thunderstorms (and Tornadoes)

Thunder is a shock wave that results in a sound wave of thunder, which is caused by the rapid heating and cooling of the air near lightning channels.

A. Types of Thunderstorms

All thunderstorms require instability and lift. Fronts, low pressure troughs or an air rising upslope produce lifts, which release the instability. Instability occurs when cooler air rises to a warmer environment. Cooler air tends to sink. The upward moving air is the updraft, and the downdraft winds produce one of the four storms below: single cell, multicell cluster, multicell line, or supercell.

1. Single Cell (pulse storms)

Typically, these storms last 20-30 minutes. Pulse storms can produce severe weather elements such as downbursts, hail, some heavy rainfall and occasionally weak tornadoes. This storm is light to moderately dangerous to the public and moderately to highly dangerous to aviation.

2. Multicell Cluster

These storms consist of a cluster of storms in varying stages of development. Multicell storms can produce moderate sized hail, flash floods, and weak tornadoes. This storm is moderately dangerous to the public and moderately to highly dangerous to aviation.

3. Multicell Line

Multicell line storms consist of a line of storms with a continuous, well developed gust front at the leading edge of the line. Also known as squall lines, these storms can produce small to moderate sized hail, occasional flash floods and weak tornadoes. This storm is moderately dangerous to the public and moderately to highly dangerous to aviation.

4. Supercell

Even though it is the rarest of storm types, the supercell is the most dangerous because of the extreme weather generated. Defined as a thunderstorm with a rotating updraft, these storms can produce strong downbursts, large hail, occasional flash floods and weak to violent tornadoes. This storm is extremely dangerous to the public and aviation.

5. Tornadoes

A tornado is a highly unpredictable, violently rotating column of air in contact with the ground and extending from the base of a thunderstorm characterized by a twisting, funnel shaped cloud. It is spawned when cool air overrides a layer of warm air, forcing the warm air to rise rapidly.

The most destructive and deadly tornadoes occur from supercells, which are rotating thunderstorms with a well-defined radar circulation called a mesocyclone. Tornado season is generally March through August, although tornadoes can occur at any time of year. They tend to occur in the afternoons and evenings (over 80 percent of all tornado strikes occur between noon and midnight).

The damage from a tornado is a result of the high wind velocity (up to 250mph) and wind-blown debris with paths that can be more than one mile wide and fifty miles long. Tornadoes gain their destructive power by increasing wind speed and picking up all debris in its path. They have been known to blow off roofs of houses, move cars and tractor trailers, and demolish homes.

B. Definition of “Severe Thunderstorms”

This hazard mitigation plan document analyzes the “severe thunderstorm” hazard using the definition articulated by the National Weather Service (NWS) for its forecasts: A “severe thunderstorm” produces a tornado, winds of at least 58 miles per hour (i.e., 50 knots), and/or hail at least one (1) inch in diameter.

In terms of variable labels used by the National Weather Service (and reflected in the National Center for Environmental Information Storm Events Database), this document will isolate records to “Hail” events one (1) inch in diameter or above, “Thunderstorm Wind¹⁹” events, “High Wind” events, and “Tornado” events.

C. Historical Severe Thunderstorm Data

See table on following pages

¹⁹ A note on the “Thunderstorm Wind” variable: Early records label past events as “Thunderstorm Wind,” but cite that wind speeds were zero (0) knots. This plan is interpreting this relationship as the result of bad records in the past. That NWS labeled the past event (likely retroactively) a “Thunderstorm Wind” event signifies for this plan that wind speeds were assumed or estimated at 50 knots or above. The record shows zero (0) knots because the exact wind speed was not recorded. But, the plan wants the frequency of events cited.

Franklin County/City of Frankfort Severe Thunderstorm Events, Extent, and Impacts, 1964-2021

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN CO.		3/25/1964	Tornado	N/A	F1	0	0	\$ 2,500.00	\$ -	0	0
2	FRANKLIN CO.		5/25/1970	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
3	FRANKLIN CO.		3/15/1971	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
4	FRANKLIN CO.		7/4/1973	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
5	FRANKLIN CO.		9/5/1973	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
6	FRANKLIN CO.		12/26/1973	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.		4/3/1974	Thunderstorm Wind	85 Knots		0	0	\$ -	\$ -	0	0
7	FRANKLIN CO.		4/3/1974	Tornado	N/A	F4	4	85	\$ 250,000.00	\$ -	0	0
8	FRANKLIN CO.		7/30/1978	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
9	FRANKLIN CO.		6/29/1979	Tornado	N/A	F2	0	0	\$ 250.00	\$ -	0	0
10	FRANKLIN CO.		6/21/1981	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
11	FRANKLIN CO.		3/20/1982	Tornado	N/A	F2	0	0	\$ 2,500,000.00	\$ -	0	0
12	FRANKLIN CO.		4/3/1982	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
13	FRANKLIN CO.		5/29/1982	Hail	2 Inches		0	0	\$ -	\$ -	0	0
14	FRANKLIN CO.		5/31/1982	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.		5/31/1982	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
15	FRANKLIN CO.		6/9/1982	Hail	1 Inch		0	0	\$ -	\$ -	0	0
16	FRANKLIN CO.		3/15/1984	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
17	FRANKLIN CO.		9/14/1984	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.		9/14/1984	Tornado	N/A	F0	0	0	\$ 25,000.00	\$ -	0	0
18	FRANKLIN CO.		6/10/1985	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
19	FRANKLIN CO.		3/12/1986	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
20	FRANKLIN CO.		6/16/1987	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
21	FRANKLIN CO.		7/5/1987	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
22	FRANKLIN CO.		7/6/1987	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
23	FRANKLIN CO.		8/5/1989	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
24	FRANKLIN CO.		5/16/1990	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
25	FRANKLIN CO.		6/6/1990	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
26	FRANKLIN CO.		7/8/1991	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
27	FRANKLIN CO.		6/18/1992	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
28	FRANKLIN CO.		7/9/1992	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
29	FRANKLIN CO.		11/14/1993	Thunderstorm Wind	0 Knots		0	0	\$ 50,000.00	\$ -	0	0
30	FRANKLIN CO.	Frankfort	7/5/1994	Thunderstorm Wind	0 Knots		0	0	\$ 500.00	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
31	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 5,000,000.00	\$ -	0	0
	FRANKLIN CO.	Graefenburg	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 500,000.00	\$ -	0	0
	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 500,000.00	\$ -	0	0
	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 50,000.00	\$ -	0	0
	FRANKLIN CO.	Frankfort	5/14/1995	Tornado	No Data		0	0	\$ -	\$ -	0	0
32	FRANKLIN CO.	Frankfort	6/10/1995	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
33	FRANKLIN CO.	FRANKFORT	5/5/1996	Hail	2 Inches		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	5/5/1996	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
34	FRANKLIN CO.	EVERGREEN	5/28/1996	Hail	1 Inch		0	0	\$ -	\$ -	0	0
35	FRANKLIN CO.	FRANKFORT	9/16/1996	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
36	FRANKLIN (ZONE)		12/24/1997	High Wind	50 Knots		0	0	\$ 10,000.00	\$ -	0	0
37	FRANKLIN CO.	FRANKFORT	6/12/1998	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
38	FRANKLIN CO.	FRANKFORT	6/14/1998	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
39	FRANKLIN CO.	FRANKFORT	6/22/1998	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
40	FRANKLIN (ZONE)		2/7/1999	High Wind	No Data		0	0	\$ 1,000.00	\$ -	0	0
41	FRANKLIN CO.	FRANKFORT	7/10/2000	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
42	FRANKLIN CO.	FRANKFORT	8/9/2000	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
43	FRANKLIN CO.	FRANKFORT	10/5/2000	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
44	FRANKLIN CO.	FRANKFORT	11/9/2000	Thunderstorm Wind	70 Knots		0	0	\$ -	\$ -	0	0
45	FRANKLIN CO.	FRANKFORT	7/8/2001	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
46	FRANKLIN CO.	FRANKFORT	10/24/2001	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
47	FRANKLIN CO.	FRANKFORT	7/29/2002	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
48	FRANKLIN CO.	SWITZER	11/10/2002	Thunderstorm Wind	75 Knots		0	0	\$ 20,000.00	\$ -	0	0
49	FRANKLIN CO.	FRANKFORT	5/27/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
50	FRANKLIN CO.	FRANKFORT	5/30/2004	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	5/30/2004	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	6/1/2004	Hail	1.5 Inches		0	0	\$ -	\$ -	0	0
51	FRANKLIN CO.	FRANKFORT	6/1/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
52	FRANKLIN CO.	FRANKFORT	6/13/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
53	FRANKLIN CO.	FRANKFORT	7/5/2004	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
54	FRANKLIN CO.	FRANKFORT	7/13/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
55	FRANKLIN CO.	FRANKFORT	4/2/2006	Thunderstorm Wind	60 Knots		0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	COUNTYWIDE	4/2/2006	Thunderstorm Wind	50 Knots		0	0	\$ 10,000.00	\$ -	0	0
56	FRANKLIN CO.	COUNTYWIDE	5/25/2006	Thunderstorm Wind	50 Knots		0	0	\$ 20,000.00	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
57	FRANKLIN CO.	FRANKFORT	8/20/2006	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
58	FRANKLIN CO.	FRANKFORT	4/3/2007	Thunderstorm Wind	59 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/3/2007	Thunderstorm Wind	70 Knots		0	0	\$ 50,000.00	\$ -	0	0
59	FRANKLIN CO.	FRANKFORT	6/5/2007	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	6/5/2007	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
60	FRANKLIN CO.	POLSGROVE	8/16/2007	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
61	FRANKLIN CO.	FRANKFORT	1/29/2008	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
62	FRANKLIN CO.	STEDMANTOWN	2/6/2008	Tornado	N/A	EF1	0	0	\$ 250,000.00	\$250,000.00	0	0
63	FRANKLIN CO.	FRANKFORT	7/20/2008	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
64	FRANKLIN (ZONE)		2/11/2009	High Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN (ZONE)		2/11/2009	High Wind	51 Knots		0	0	\$ -	\$ -	0	0
65	FRANKLIN CO.	FRANKFORT	2/27/2009	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
66	FRANKLIN (ZONE)		12/9/2009	High Wind	50 Knots		0	0	\$ -	\$ -	0	0
67	FRANKLIN CO.	FRANKFORT	5/21/2010	Hail	1 Inch		0	0	\$ -	\$ -	0	0
68	FRANKLIN CO.	FRANKFORT	10/26/2010	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
69	FRANKLIN CO.	FLAG FORK	2/28/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	SWALLOWFIELD	2/28/2011	Thunderstorm Wind	56 Knots		0	0	\$ 25,000.00	\$ -	0	0
70	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/20/2011	Thunderstorm Wind	59 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/20/2011	Tornado	N/A	EF0	0	0	\$ -	\$ -	0	0
71	FRANKLIN CO.	FRANKFORT	4/23/2011	Hail	1 Inch		0	0	\$ -	\$ -	0	0
72	FRANKLIN CO.	BENSON	5/23/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	BENSON	5/23/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FLAG FORK	5/23/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
73	FRANKLIN CO.	FRANKFORT	7/19/2011	Hail	1 Inch		0	0	\$ -	\$ -	0	0
74	FRANKLIN CO.	STEDMANTOWN	8/13/2011	Thunderstorm Wind	52 Knots		0	0	\$ 15,000.00	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	8/13/2011	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
75	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	56 Knots		0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF- Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
76	FRANKLIN CO.	CLOVERDALE	3/2/2012	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	3/2/2012	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
77	FRANKLIN CO.	FRANKFT CPTL CITY AR	7/1/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FARMDALE	7/1/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
78	FRANKLIN CO.	PEAKS MILL	7/18/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
79	FRANKLIN CO.	HARVIELAND	7/26/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
80	FRANKLIN CO.	FRANKFORT	7/27/2012	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
81	FRANKLIN CO.	FRANKFORT	9/5/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
82	FRANKLIN CO.	FRANKFORT	6/26/2013	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
83	FRANKLIN CO.	PEAKS MILL	8/21/2013	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
84	FRANKLIN CO.	PEAKS MILL	10/31/2013	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
85	FRANKLIN CO.	BRIDGEPORT	12/21/2013	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	12/21/2013	Thunderstorm Wind	51 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	12/21/2013	Thunderstorm Wind	52 Knots		0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	12/21/2013	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	12/21/2013	Thunderstorm Wind	71 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	LANES MILL	12/21/2013	Thunderstorm Wind	55 Knots		0	0	\$ -	\$ -	0	0
86	FRANKLIN CO.	PEAKS MILL	2/20/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
87	FRANKLIN CO.	FARMDALE	5/21/2014	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	LANES MILL	5/21/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
88	FRANKLIN CO.	FARMDALE	6/4/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
89	FRANKLIN CO.	JETT	6/20/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	6/20/2014	Thunderstorm Wind	52 Knots		0	0	\$ 30,000.00	\$ -	0	0
90	FRANKLIN CO.	PEAKS MILL	10/7/2014	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	10/7/2014	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	SWITZER	10/7/2014	Thunderstorm Wind	52 Knots		0	0	\$ 6,000.00	\$ -	0	0
91	FRANKLIN CO.	STEDMANTOWN	4/3/2015	Hail	1 Inch		0	0	\$ -	\$ -	0	0
92	FRANKLIN CO.	STEDMANTOWN	5/11/2015	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	JETT	5/11/2015	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
93	FRANKLIN CO.	CHOATEVILLE	6/26/2015	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
94	FRANKLIN CO.	SLICKWAY	7/10/2015	Thunderstorm Wind	52 Knots		0	0	\$ 10,000.00	\$ -	0	0
95	FRANKLIN CO.	FRANKFORT	7/13/2015	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
96	FRANKLIN CO.	CLOVERDALE	9/5/2015	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
97	FRANKLIN CO.	STEDMANTOWN	12/23/2015	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	LANES MILL	12/23/2015	Thunderstorm Wind	55 Knots		0	0	\$ -	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF- Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
98	FRANKLIN CO.	STEDMANTOWN	3/31/2016	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
99	FRANKLIN (ZONE)		4/2/2016	High Wind	60 Knots		0	0	\$ 2,000.00	\$ -	0	0
100	FRANKLIN CO.	FRANKFORT	4/26/2016	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/26/2016	Thunderstorm Wind	52 Knots		0	0	\$ 10,000.00	\$ -	0	0
101	FRANKLIN CO.	SLICKWAY	8/28/2016	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
102	FRANKLIN CO.	PEAKS MILL	9/10/2016	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	9/10/2016	Thunderstorm Wind	52 Knots		0	0	\$ 20,000.00	\$ -	0	0
103	FRANKLIN CO.	FRANKFT CPTL CITY AR	3/1/2017	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	53 Knots		0	0	\$ 25,000.00	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	55 Knots		0	0	\$ 150,000.00	\$ -	0	0
104	FRANKLIN CO.	BRIDGEPORT	3/27/2017	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	3/27/2017	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	LANES MILL	3/27/2017	Thunderstorm Wind	51 Knots		0	0	\$ -	\$ -	0	0
105	FRANKLIN CO.	FARMDALE	4/5/2017	Thunderstorm Wind	63 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	KENNEBEC	4/5/2017	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
106	FRANKLIN CO.	BRIDGEPORT	4/30/2017	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/30/2017	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
107	FRANKLIN CO.	FRANKFORT	6/18/2017	Thunderstorm Wind	53 Knots		0	0	\$ 15,000.00	\$ -	0	0
108	FRANKLIN CO.	BIG EDDY	5/31/2018	Thunderstorm Wind	54 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFT CPTL CITY AR	5/31/2018	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
109	FRANKLIN CO.	FRANKFORT	6/26/2018	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
110	FRANKLIN CO.	PEAKS MILL	7/2/2018	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
111	FRANKLIN CO.	CLOVERDALE	7/20/2018	Thunderstorm Wind	52 Knots		0	0	\$ 45,000.00	\$ -	0	0
	FRANKLIN CO.	LANES MILL	7/20/2018	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
112	FRANKLIN CO.	FRANKFORT	3/14/2019	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	HARVIELAND	3/14/2019	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
113	FRANKLIN CO.	PEAKS MILL	6/5/2019	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
114	FRANKLIN CO.	BIG EDDY	7/9/2020	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	7/9/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	KENNEBEC	7/9/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	7/9/2020	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	7/9/2020	Thunderstorm Wind	51 Knots		0	0	\$ -	\$ -	0	0
115	FRANKLIN CO.	FRANKFT CPTL CITY AR	8/18/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	BIG EDDY	8/18/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
116	FRANKLIN CO.	FRANKFT CPTL CITY AR	6/11/2021	Thunderstorm Wind	57 Knots		0	0	\$ -	\$ -	0	0
117	FRANKLIN CO.	CHOATEVILLE	12/6/2021	Tornado	N/A	EF1	0	0	\$ -	\$ -	0	0
	TOTALS:						4	85	\$ 9,622,250.00	\$250,000.00	0	0

Franklin County/City of Frankfort Severe Thunderstorm Events, Extents, and Impacts via Event Narrative, 1964-2021

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
1	FRANKLIN CO.		3/25/1964	Tornado	N/A	F1	
2	FRANKLIN CO.		5/25/1970	Thunderstorm Wind	0 Knots		
3	FRANKLIN CO.		3/15/1971	Thunderstorm Wind	0 Knots		
4	FRANKLIN CO.		7/4/1973	Thunderstorm Wind	0 Knots		
5	FRANKLIN CO.		9/5/1973	Thunderstorm Wind	0 Knots		
6	FRANKLIN CO.		12/26/1973	Thunderstorm Wind	0 Knots		
	FRANKLIN CO.		4/3/1974	Thunderstorm Wind	85 Knots		
7	FRANKLIN CO.		4/3/1974	Tornado	N/A	F4	
8	FRANKLIN CO.		7/30/1978	Thunderstorm Wind	0 Knots		
9	FRANKLIN CO.		6/29/1979	Tornado	N/A	F2	
10	FRANKLIN CO.		6/21/1981	Thunderstorm Wind	0 Knots		
11	FRANKLIN CO.		3/20/1982	Tornado	N/A	F2	
12	FRANKLIN CO.		4/3/1982	Thunderstorm Wind	0 Knots		
13	FRANKLIN CO.		5/29/1982	Hail	2 Inches		
14	FRANKLIN CO.		5/31/1982	Hail	1 Inch		
	FRANKLIN CO.		5/31/1982	Thunderstorm Wind	0 Knots		
15	FRANKLIN CO.		6/9/1982	Hail	1 Inch		
16	FRANKLIN CO.		3/15/1984	Thunderstorm Wind	0 Knots		
17	FRANKLIN CO.		9/14/1984	Thunderstorm Wind	0 Knots		
	FRANKLIN CO.		9/14/1984	Tornado	N/A	F0	
18	FRANKLIN CO.		6/10/1985	Thunderstorm Wind	0 Knots		
19	FRANKLIN CO.		3/12/1986	Thunderstorm Wind	0 Knots		
20	FRANKLIN CO.		6/16/1987	Thunderstorm Wind	0 Knots		
21	FRANKLIN CO.		7/5/1987	Thunderstorm Wind	0 Knots		
22	FRANKLIN CO.		7/6/1987	Thunderstorm Wind	0 Knots		
23	FRANKLIN CO.		8/5/1989	Thunderstorm Wind	0 Knots		
24	FRANKLIN CO.		5/16/1990	Thunderstorm Wind	0 Knots		
25	FRANKLIN CO.		6/6/1990	Thunderstorm Wind	52 Knots		
26	FRANKLIN CO.		7/8/1991	Thunderstorm Wind	0 Knots		
27	FRANKLIN CO.		6/18/1992	Hail	1.75 Inches		
28	FRANKLIN CO.		7/9/1992	Thunderstorm Wind	0 Knots		
29	FRANKLIN CO.		11/14/1993	Thunderstorm Wind	0 Knots		Strong thunderstorm winds blew out windows in several apartments in the western portion of Frankfort. Trees and power lines were also blown down.
30	FRANKLIN CO.	Frankfort	7/5/1994	Thunderstorm Wind	0 Knots		Numerous power lines were downed by high winds on King's Daughters Drive.

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
31	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		Twelve small aircraft destroyed by Capital City Airport, reported by Department of Emergency Service, relayed by TV36.
	FRANKLIN CO.	Graefenburg	5/14/1995	Thunderstorm Wind	0 Knots		Seventy-five mph gust reported by HAM radio operator. Homes and barns were damaged and trees were down.
	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		Power lines down and damage to Lowe's Hardware store.
	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		Trees and power lines down. House damaged along U.S. 60 in Western Frankfort reported by city police.
	FRANKLIN CO.	Frankfort	5/14/1995	Tornado	No Data		Tornado touchdown along Route 421 reported by county dispatch.
32	FRANKLIN CO.	Frankfort	6/10/1995	Thunderstorm Wind	0 Knots		Power lines blown down.
33	FRANKLIN CO.	FRANKFORT	5/5/1996	Hail	2 Inches		Hail two (2) inches in diameter was reported by the DES on the east side of Frankfort.
	FRANKLIN CO.	FRANKFORT	5/5/1996	Thunderstorm Wind	52 Knots		60 - 70 mph winds were reported by a spotter in Frankfort.
34	FRANKLIN CO.	EVERGREEN	5/28/1996	Hail	1 Inch		Hail one (1) inch in diameter was reported.
35	FRANKLIN CO.	FRANKFORT	9/16/1996	Thunderstorm Wind	50 Knots		Trees went down on power lines off Highway 421.
36	FRANKLIN (ZONE)		12/24/1997	High Wind	50 Knots		High gradient winds between 8 pm and 9 pm est knocked down numerous trees and power lines and damaged two greenhouses and one house in downtown Frankfort.
37	FRANKLIN CO.	FRANKFORT	6/12/1998	Thunderstorm Wind	50 Knots		
38	FRANKLIN CO.	FRANKFORT	6/14/1998	Thunderstorm Wind	50 Knots		
39	FRANKLIN CO.	FRANKFORT	6/22/1998	Thunderstorm Wind	50 Knots		
40	FRANKLIN (ZONE)		2/7/1999	High Wind	No Data		Large trees down over western sections of the county, Minor roof damage over eastern sections of the county
41	FRANKLIN CO.	FRANKFORT	7/10/2000	Thunderstorm Wind	50 Knots		
42	FRANKLIN CO.	FRANKFORT	8/9/2000	Thunderstorm Wind	60 Knots		
43	FRANKLIN CO.	FRANKFORT	10/5/2000	Thunderstorm Wind	60 Knots		
44	FRANKLIN CO.	FRANKFORT	11/9/2000	Thunderstorm Wind	70 Knots		
45	FRANKLIN CO.	FRANKFORT	7/8/2001	Thunderstorm Wind	60 Knots		
46	FRANKLIN CO.	FRANKFORT	10/24/2001	Thunderstorm Wind	60 Knots		
47	FRANKLIN CO.	FRANKFORT	7/29/2002	Thunderstorm Wind	50 Knots		
48	FRANKLIN CO.	SWITZER	11/10/2002	Thunderstorm Wind	75 Knots		A mobile home was blown off its foundation.
49	FRANKLIN CO.	FRANKFORT	5/27/2004	Thunderstorm Wind	50 Knots		Numerous trees were downed.
50	FRANKLIN CO.	FRANKFORT	5/30/2004	Thunderstorm Wind	52 Knots		
	FRANKLIN CO.	FRANKFORT	5/30/2004	Thunderstorm Wind	60 Knots		Numerous trees were downed.
	FRANKLIN CO.	FRANKFORT	6/1/2004	Hail	1.5 Inches		
51	FRANKLIN CO.	FRANKFORT	6/1/2004	Thunderstorm Wind	50 Knots		Trees and power lines were downed.
52	FRANKLIN CO.	FRANKFORT	6/13/2004	Thunderstorm Wind	50 Knots		Trees were downed and blocking highway 421.
53	FRANKLIN CO.	FRANKFORT	7/5/2004	Thunderstorm Wind	60 Knots		Several large trees were blown down.
54	FRANKLIN CO.	FRANKFORT	7/13/2004	Thunderstorm Wind	50 Knots		Trees were down along Highway 460.
55	FRANKLIN CO.	FRANKFORT	4/2/2006	Thunderstorm Wind	60 Knots		There was unspecified damage to a barn due to thunderstorm winds. Large hail also fell, but the size was not reported.
	FRANKLIN CO.	COUNTYWIDE	4/2/2006	Thunderstorm Wind	50 Knots		The Buffalo Trace Distillery suffered moderate roof damage. Trees and power lines were downed.
56	FRANKLIN CO.	COUNTYWIDE	5/25/2006	Thunderstorm Wind	50 Knots		Trees were downed countywide. In Frankfort, one was blown on to an apartment building.

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
57	FRANKLIN CO.	FRANKFORT	8/20/2006	Thunderstorm Wind	50 Knots		Trees were downed.
58	FRANKLIN CO.	FRANKFORT	4/3/2007	Thunderstorm Wind	59 Knots		
	FRANKLIN CO.	FRANKFORT	4/3/2007	Thunderstorm Wind	70 Knots		Numerous trees and power lines were downed across the city of Frankfort. The exterior wall of an apartment building collapsed.
59	FRANKLIN CO.	FRANKFORT	6/5/2007	Hail	1 Inch		
	FRANKLIN CO.	FRANKFORT	6/5/2007	Hail	1.75 Inches		
60	FRANKLIN CO.	POLSGROVE	8/16/2007	Thunderstorm Wind	50 Knots		Trees were downed along Shadrick Ferry Road.
61	FRANKLIN CO.	FRANKFORT	1/29/2008	Thunderstorm Wind	60 Knots		Thunderstorm winds downed trees on Grand Avenue.
62	FRANKLIN CO.	STEDMANTOWN	2/6/2008	Tornado	N/A	EF1	The tornado downed numerous hardwood trees on a steep ridge near Elkhorn Creek. It increased in intensity as it moved to the northeast, and did extensive roof damage to two homes on the west side of Lucas Lane. It destroyed five barns on the east side of the road.
63	FRANKLIN CO.	FRANKFORT	7/20/2008	Thunderstorm Wind	52 Knots		Trees and power lines were reported down across the county.
64	FRANKLIN (ZONE)		2/11/2009	High Wind	56 Knots		High winds downed tree branches and loose rocks were falling along Louisville Hill and Interstate 64 between the Frankfort exits.
	FRANKLIN (ZONE)		2/11/2009	High Wind	51 Knots		Wind gust measured by the Kentucky Mesonet site 7 miles south of Frankfort.
65	FRANKLIN CO.	FRANKFORT	2/27/2009	Thunderstorm Wind	53 Knots		
66	FRANKLIN (ZONE)		12/9/2009	High Wind	50 Knots		Strong gradient winds brought power outages to over 500 customers in Frankfort and throughout the county during the late morning and early afternoon hours. A peak gust of 54 mph was measured by ASOS at the Frankfort Airport.
67	FRANKLIN CO.	FRANKFORT	5/21/2010	Hail	1 Inch		
68	FRANKLIN CO.	FRANKFORT	10/26/2010	Thunderstorm Wind	52 Knots		A NWS employee reported estimated winds of 60 mph as well as a roll cloud.
69	FRANKLIN CO.	FLAG FORK	2/28/2011	Thunderstorm Wind	52 Knots		Several trees were down near the small town of Flag Fork.
	FRANKLIN CO.	SWALLOWFIELD	2/28/2011	Thunderstorm Wind	56 Knots		A NWS storm survey confirmed that straight line winds up to 65 mph destroyed a barn near Polsgrove. A large tractor shed was destroyed on Bates Rd. near Swallowfield. Several trees were also downed near Indian Gap Rd.
70	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/20/2011	Thunderstorm Wind	59 Knots		The ASOS at Capital City Airport in Frankfort measured a gust of 68 mph.
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		Capital Ave. was closed by a downed tree.
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		Trees were down on roadways throughout the city. A sign was blown into a window at a business in the 800 block of Louisville Rd.
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		Multiple trees were downed countywide. Power outages were reported both east and west of Frankfort.
	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/20/2011	Tornado	N/A	EF0	An NWS Storm Survey confirmed an EF-0 tornado with estimated wind speeds of 70 mph. Several trees were damaged and shingles were knocked off of houses. The most intense damage was found near the Frankfort cemetery and the Frankfort capitol building.
71	FRANKLIN CO.	FRANKFORT	4/23/2011	Hail	1 Inch		
72	FRANKLIN CO.	BENSON	5/23/2011	Thunderstorm Wind	52 Knots		A tree was blown down across Mt. Zion Rd. in western Franklin county.
	FRANKLIN CO.	BENSON	5/23/2011	Thunderstorm Wind	52 Knots		A tree was blown down across Bryant-Benson Rd.
	FRANKLIN CO.	FLAG FORK	5/23/2011	Thunderstorm Wind	52 Knots		A tree was blown down across Dry Ridge Rd. in Franklin county.

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
73	FRANKLIN CO.	FRANKFORT	7/19/2011	Hail	1 Inch		
74	FRANKLIN CO.	STEDMANTOWN	8/13/2011	Thunderstorm Wind	52 Knots		Downed trees and power lines were reported from near the intersections of Aztec Trail and Schenkel Lane, and of Owenton Road and Royal Parkway. A fallen tree damaged the roof of a home on Country Lane. Kentucky Utilities reported that power outages affected around 2,000 homes across eastern Franklin County.
	FRANKLIN CO.	PEAKS MILL	8/13/2011	Thunderstorm Wind	60 Knots		A spotter reported trees snapped near Peaks Mill, which is located 5 miles north of Frankfort.
75	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	52 Knots		A spotter reported that a shop was destroyed on Leestown Road near Frankfort.
	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	56 Knots		An NWS survey team identified straight line wind damage next to Leestown Road near the intersection of Highways 421 and 60 just east of Frankfort. A power pole was blown down. At a storage unit facility, the roof was removed from three individual storage units.
	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	52 Knots		Local media reported that a roof was blown off a storage facility on Leestown Road.
76	FRANKLIN CO.	CLOVERDALE	3/2/2012	Hail	1.75 Inches		
	FRANKLIN CO.	FRANKFORT	3/2/2012	Hail	1.75 Inches		
77	FRANKLIN CO.	FRANKFT CPTL CITY AR	7/1/2012	Thunderstorm Wind	52 Knots		A tree fell next adjacent to Farmer's Bank, located just off of U.S. Highway 60 in Frankfort.
	FRANKLIN CO.	FARMDALE	7/1/2012	Thunderstorm Wind	52 Knots		The Kentucky Mesonet located 7 miles south of Frankfort measured a 51 mph wind gust. Local emergency management reported several downed trees across the southern portion of Franklin County.
78	FRANKLIN CO.	PEAKS MILL	7/18/2012	Thunderstorm Wind	52 Knots		A large tree was toppled in the Peaks Mill Area 10 miles north northeast of Frankfort.
79	FRANKLIN CO.	HARVIELAND	7/26/2012	Thunderstorm Wind	52 Knots		A tree was toppled by thunderstorm winds near the intersection of Bald Knob and Bark Branch Roads.
80	FRANKLIN CO.	FRANKFORT	7/27/2012	Thunderstorm Wind	60 Knots		A large tree fell on a house near Nole Avenue. Local emergency management relayed multiple reports of trees and power lines down across Frankfort. Several roads become briefly impassable in the Thornhill neighborhood.
81	FRANKLIN CO.	FRANKFORT	9/5/2012	Thunderstorm Wind	52 Knots		In Frankfort, a tree was downed at the intersection of Clinton and Ann Streets.
82	FRANKLIN CO.	FRANKFORT	6/26/2013	Thunderstorm Wind	60 Knots		The Franklin County emergency manager reported several trees down in Frankfort.
83	FRANKLIN CO.	PEAKS MILL	8/21/2013	Thunderstorm Wind	52 Knots		Local law enforcement reported two trees down along Peaks Mill Road.
84	FRANKLIN CO.	PEAKS MILL	10/31/2013	Thunderstorm Wind	50 Knots		A tree fell across the Royal Parkway near Frankfort. A nearby weather station recorded a gust of 58 mph.
85	FRANKLIN CO.	BRIDGEPORT	12/21/2013	Thunderstorm Wind	52 Knots		The public reported via Twitter of a tree downed across Old Sheep Pen Road west of Frankfort.
	FRANKLIN CO.	FRANKFORT	12/21/2013	Thunderstorm Wind	51 Knots		The ASOS site at the Frankfort airport measured a wind gust of 59 mph.
	FRANKLIN CO.	FRANKFORT	12/21/2013	Thunderstorm Wind	52 Knots		Many reports arrived concerning downed trees, power lines and blown transformers south of Wilkinson Road and north of east Main Street in Frankfort.
	FRANKLIN CO.	STEDMANTOWN	12/21/2013	Thunderstorm Wind	50 Knots		A tree was downed on a residential property in the Indian Hills Subdivision.
	FRANKLIN CO.	STEDMANTOWN	12/21/2013	Thunderstorm Wind	71 Knots		A trained spotter with a reliable anemometer measured an 82 mph wind gust at his residence. His location fell within an area where numerous other damage reports were received.
	FRANKLIN CO.	LANES MILL	12/21/2013	Thunderstorm Wind	55 Knots		The Kentucky Mesonet in Franklin County reported a 63 mph wind gust.
86	FRANKLIN CO.	PEAKS MILL	2/20/2014	Thunderstorm Wind	52 Knots		Several trees were downed across the county, including one on Sulfur Licks Road north of Frankfort. Another tree was reported down along US 421 north of Frankfort. A trained spotter east of Frankfort measured a 57 mph wind gust.

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
87	FRANKLIN CO.	FARMDALE	5/21/2014	Thunderstorm Wind	56 Knots		A spotter reported large limbs downed by estimated 65 mph wind gusts.
	FRANKLIN CO.	LANES MILL	5/21/2014	Thunderstorm Wind	52 Knots		The Kentucky Mesonet several miles south of Frankfort measured a 60 mph wind gust. Several miles north, the Frankfort Airport ASOS measured a 48 mph gust.
88	FRANKLIN CO.	FARMDALE	6/4/2014	Thunderstorm Wind	52 Knots		The Kentucky Mesonet site 7 miles south of Frankfort recorded a 60 mph wind gust.
89	FRANKLIN CO.	JETT	6/20/2014	Thunderstorm Wind	52 Knots		The Frankfort media reported several power lines down just east of Frankfort.
	FRANKLIN CO.	FRANKFORT	6/20/2014	Thunderstorm Wind	52 Knots		Local law enforcement reported that a tree fell across a house in east Frankfort. Several people sent pictures via social media of trees down in the Silver Lake neighborhood just east of Frankfort. A spotter with a weather station recorded a wind gust of 55 mph.
90	FRANKLIN CO.	PEAKS MILL	10/7/2014	Hail	1 Inch		Hail up to quarter size fell in the Peaks Mill area.
	FRANKLIN CO.	PEAKS MILL	10/7/2014	Hail	1 Inch		The first of two supercells that tracked over Franklin County brought quarter sized hail.
	FRANKLIN CO.	SWITZER	10/7/2014	Thunderstorm Wind	52 Knots		Several trees were downed near Switzer and Bald Knob. Powerlines were downed in Switzer as well.
91	FRANKLIN CO.	STEDMANTOWN	4/3/2015	Hail	1 Inch		The public reported 1 inch diameter hail.
92	FRANKLIN CO.	STEDMANTOWN	5/11/2015	Thunderstorm Wind	56 Knots		A trained spotter recorded a 56 knot wind gust.
	FRANKLIN CO.	JETT	5/11/2015	Thunderstorm Wind	52 Knots		A Kentucky official several trees down across the area.
93	FRANKLIN CO.	CHOATEVILLE	6/26/2015	Thunderstorm Wind	52 Knots		A trained spotter reported several trees down on River Bend Road and was confirmed with pictures sent to the NWS.
94	FRANKLIN CO.	SLICKWAY	7/10/2015	Thunderstorm Wind	52 Knots		An amateur radio operator reported power lines down in the area.
95	FRANKLIN CO.	FRANKFORT	7/13/2015	Thunderstorm Wind	50 Knots		A Franklin County law enforcement official reported that winds from a complex of thunderstorms had gusts around 50 knots.
96	FRANKLIN CO.	CLOVERDALE	9/5/2015	Thunderstorm Wind	52 Knots		The Frankfort Plant Board reported multiple power outages over southwest Franklin County. The Cloverdale and Leawood subdivisions were impacted.
97	FRANKLIN CO.	STEDMANTOWN	12/23/2015	Hail	1 Inch		A public report was received via social media of hail measuring 1 inch in diameter.
	FRANKLIN CO.	LANES MILL	12/23/2015	Thunderstorm Wind	55 Knots		A Kentucky Mesonet station recorded a 55 knot wind gust due to severe thunderstorms.
98	FRANKLIN CO.	STEDMANTOWN	3/31/2016	Thunderstorm Wind	52 Knots		Several trees were reported down in the area due to severe thunderstorm winds.
99	FRANKLIN (ZONE)		4/2/2016	High Wind	60 Knots		A privately owned weather station 1 mile west northwest of Forks of Elkhorn measured a 69 mph wind gust. Another report of damage to metal roofing was reported to a house in west Frankfort.
100	FRANKLIN CO.	FRANKFORT	4/26/2016	Hail	1 Inch		One inch diameter hail was reported by the public via social media.
	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/26/2016	Thunderstorm Wind	52 Knots		The Franklin County emergency manager reported that severe thunderstorm winds resulted in several locations without power including the western portions of Frankfort.
101	FRANKLIN CO.	SLICKWAY	8/28/2016	Thunderstorm Wind	52 Knots		Trained spotters reported trees down in the area.
102	FRANKLIN CO.	PEAKS MILL	9/10/2016	Thunderstorm Wind	52 Knots		Local officials reported trees down around the county including one on Old Stewart Road.
	FRANKLIN CO.	FRANKFORT	9/10/2016	Thunderstorm Wind	52 Knots		Officials reported a tree down on the Dollar General store.

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
103	FRANKLIN CO.	FRANKFT CPTL CITY AR	3/1/2017	Hail	1 Inch		The Franklin County Emergency Manager reported hail 1 inch in diameter.
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	52 Knots		The NWS in conjunction with a Franklin County 911 Operator found intermittent straight line wind damage around Peak's Mill. The most concentrated area of damage was near the 7500 block of Peak's Mill Road. A 15 foot by 10 foot pole barn was knocked over along with several trees and some damage to roof shingles. Estimated winds were 55 to 60 mph with a half mile parth of damage at a maximum width of 200 yards.
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	53 Knots		The Franklin County Emergency Manager reported sheds were blown down due to severe thunderstorm winds.
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	55 Knots		The Franklin County Emergency Manager reported multiple roofs off homes and damage to farm structures in the Peaks Mill Community.
104	FRANKLIN CO.	BRIDGEPORT	3/27/2017	Hail	1 Inch		Trained spotters reported lots of hail up to the size of quarters covering Interstate 64.
	FRANKLIN CO.	STEDMANTOWN	3/27/2017	Hail	1 Inch		The public reported hail up to the size of quarters.
	FRANKLIN CO.	LANES MILL	3/27/2017	Thunderstorm Wind	51 Knots		The Franklin County Mesonet near Frankfort recorded a 51 knot wind gust.
105	FRANKLIN CO.	FARMDALE	4/5/2017	Thunderstorm Wind	63 Knots		
	FRANKLIN CO.	KENNEBEC	4/5/2017	Thunderstorm Wind	53 Knots		Trees were reported down on Pearidge Rd in Frankfort.
106	FRANKLIN CO.	BRIDGEPORT	4/30/2017	Thunderstorm Wind	53 Knots		Trees were reported down on Interstate 64.
	FRANKLIN CO.	FRANKFORT	4/30/2017	Thunderstorm Wind	53 Knots		Trees were reported down in the area.
107	FRANKLIN CO.	FRANKFORT	6/18/2017	Thunderstorm Wind	53 Knots		Local broadcast media reported trees and power poles snapped.
108	FRANKLIN CO.	BIG EDDY	5/31/2018	Thunderstorm Wind	54 Knots		There were more than 2 dozen reports of trees down across the southern part of the county south of Frankfort.
	FRANKLIN CO.	FRANKFT CPTL CITY AR	5/31/2018	Thunderstorm Wind	52 Knots		The ASOS at Capital City Airport measured a 52 knot wind gust.
109	FRANKLIN CO.	FRANKFORT	6/26/2018	Thunderstorm Wind	52 Knots		Trees were reported down on Versailles Road.
110	FRANKLIN CO.	PEAKS MILL	7/2/2018	Thunderstorm Wind	53 Knots		Dispatch reported four trees down across the county due to the thunderstorms.
111	FRANKLIN CO.	CLOVERDALE	7/20/2018	Thunderstorm Wind	52 Knots		The county reported multiple trees were down around the city, as well as some power lines.
	FRANKLIN CO.	LANES MILL	7/20/2018	Thunderstorm Wind	53 Knots		The mesonet in Franklin County recorded a wind gust of 53 knots.
112	FRANKLIN CO.	FRANKFORT	3/14/2019	Thunderstorm Wind	52 Knots		A few trees were snapped near Alumni Stadium at Kentucky State University.
	FRANKLIN CO.	HARVIELAND	3/14/2019	Thunderstorm Wind	53 Knots		A few trees blew down on the north side of Frankfort.
113	FRANKLIN CO.	PEAKS MILL	6/5/2019	Thunderstorm Wind	53 Knots		A tree fell on Camp Pleasant Drive.
114	FRANKLIN CO.	BIG EDDY	7/9/2020	Thunderstorm Wind	52 Knots		A tree blew down near the Old Capitol parking structure of Kentucky 420.
	FRANKLIN CO.	FRANKFORT	7/9/2020	Thunderstorm Wind	50 Knots		There was a report of a tree down.
	FRANKLIN CO.	KENNEBEC	7/9/2020	Thunderstorm Wind	50 Knots		Trees were down on Devils Hollow Road.
	FRANKLIN CO.	FRANKFORT	7/9/2020	Thunderstorm Wind	52 Knots		A transformer was sparking due to a tree down on Reilly Road.
	FRANKLIN CO.	STEDMANTOWN	7/9/2020	Thunderstorm Wind	51 Knots		There was a tree down near the Thornhill Bypass.
115	FRANKLIN CO.	FRANKFT CPTL CITY AR	8/18/2020	Thunderstorm Wind	50 Knots		A large tree branch was snapped in Juniper Hills Park in Frankfort.
	FRANKLIN CO.	BIG EDDY	8/18/2020	Thunderstorm Wind	50 Knots		A tree fell down on a car on Old Lawrenceburg Road.

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Extent, Impacts: Event Narrative
116	FRANKLIN CO.	FRANKFT CPTL CITY AR	6/11/2021	Thunderstorm Wind	57 Knots		The Frankfort ASOS reported a 57 knot wind gust at 6:31 PM EDT.
117	FRANKLIN CO.	CHOATEVILLE	12/6/2021	Tornado	N/A	EF1	<p>The National Weather Service conducted a storm damage survey in Franklin County from storms that occurred early Monday morning. The survey team determined that a tornado touched down on the 1100 block of Manley Leestown Road, about two miles north of Frankfort. Drone imagery showed a well built 40 by 60 foot barn had significant roof damage and the south wall blown out. The skipping tornado then went through a large grove of trees. Dozens of trees were twisted and uprooted, ranging from cedar to maple to Osage orange trees. About a dozen cedar trees were twisted and laying in multiple directions. The tornado then hit a well-built two-story house on the 100 block of Shadrick Ferry Road. The southwest side of the house had significant damage and that portion of the roof fell to the north northeasterly direction. Insulation from the house went from the north all the way to a southwesterly direction. A doorbell camera showed the distinct tornado with debris being thrown in all directions around 411 AM EST. The tornado appeared to lift briefly before touching down on the 6000 block of Owenton Road. A brand new, well constructed 30 by 50 barn took significant damage to the roof. Both garage doors were blown in with tool chests and many heavier items being scattered about the garage. Throughout the entire barn the thick concrete foundation was shifted about an inch. Immediately next to the barn, there was a one story family residence that had no damage whatsoever. Large sections of roof were thrown 60 yards into the neighbors trees and yard. The tornado lifted at this point. The winds were consistently between 85 and 90 mph along this narrow path, and the width was between 40 and 50 yards. The National Weather Service would like to thank Franklin County Emergency Management Deputy Ray Kinney for his assistance with the survey.</p>

Probability for Severe Thunderstorms as a Function of Previous Occurrences

For all events comprising the definition of a “severe thunderstorm” (i.e., tornadoes, straightline wind speeds 50 knots or over, and/or hail one (1) inch or more in diameter), Franklin County and the City of Frankfort have experienced 117 discrete events from 1964 to 2021. Given the date range includes January of the first year in the period-of-record and includes an event at the end of the last year in the period-of-record (i.e., December 6, 2021), this analysis assumes a full 58 years or 696 months as the period-of-record.

Franklin County and the City of Frankfort, then, experienced 117 discrete “severe thunderstorm” events over 58 years or over 696 months.

Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future approximately two (2) “severe thunderstorm” events every year (i.e., 2.0172 events per year). Stated differently, Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) “severe thunderstorm” event approximately every six (6) months (i.e., $[1/(117/696)] = 5.9487$).

In terms of isolating the three (3) components comprising a “severe thunderstorm,” Franklin County and the City of Frankfort has had 102 high straightline wind (50 knots or above) events, 18 hail events, and nine (9) tornado events in 58 years or 696 months²⁰.

Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future approximately two (2) high straightline wind (50 knot or above) events every year (i.e., 1.7586 events per year). Stated differently, Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) high straightline wind (50 knots or above) event approximately every seven (7) months (i.e., $[1/(102/696)] = 6.8235$).

Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) hail event approximately every three (3) years (i.e., $[1/(18/58)] = 3.2222$). Stated differently, Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) hail event approximately every 39 months (i.e., $[1/(18/696)] = 38.6667$).

Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) tornado event approximately every six (6) years (i.e., $[1/(9/58)] = 6.4444$). Stated differently, Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) tornado event approximately every 77 months (i.e., $[1/(9/696)] = 77.3333$).

See below for tables disaggregating high straightline wind, hail, and tornado events from the over list of “severe thunderstorm” events.

²⁰ Note that disaggregated, the number of events for high straightline winds, hail, and tornadoes does not add up to 117 events. It adds up to 129 events. This is due to double counting: As one of three components of “severe thunderstorm,” an event on a day that produced both hail and high wind will be counted once where, disaggregated, this event is counted twice.

Franklin County/City of Frankfort High Straightline Wind Events, Extent, and Impacts, 1964-2021

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN CO.		5/25/1970	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
2	FRANKLIN CO.		3/15/1971	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
3	FRANKLIN CO.		7/4/1973	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
4	FRANKLIN CO.		9/5/1973	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
5	FRANKLIN CO.		12/26/1973	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
6	FRANKLIN CO.		4/3/1974	Thunderstorm Wind	85 Knots		0	0	\$ -	\$ -	0	0
7	FRANKLIN CO.		7/30/1978	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
8	FRANKLIN CO.		6/21/1981	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
9	FRANKLIN CO.		4/3/1982	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
10	FRANKLIN CO.		5/31/1982	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
11	FRANKLIN CO.		3/15/1984	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
12	FRANKLIN CO.		9/14/1984	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
13	FRANKLIN CO.		6/10/1985	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
14	FRANKLIN CO.		3/12/1986	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
15	FRANKLIN CO.		6/16/1987	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
16	FRANKLIN CO.		7/5/1987	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
17	FRANKLIN CO.		7/6/1987	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
18	FRANKLIN CO.		8/5/1989	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
19	FRANKLIN CO.		5/16/1990	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
20	FRANKLIN CO.		6/6/1990	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
21	FRANKLIN CO.		7/8/1991	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
22	FRANKLIN CO.		7/9/1992	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
23	FRANKLIN CO.		11/14/1993	Thunderstorm Wind	0 Knots		0	0	\$ 50,000.00	\$ -	0	0
24	FRANKLIN CO.	Frankfort	7/5/1994	Thunderstorm Wind	0 Knots		0	0	\$ 500.00	\$ -	0	0
25	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 5,000,000.00	\$ -	0	0
	FRANKLIN CO.	Graefenburg	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 500,000.00	\$ -	0	0
	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 500,000.00	\$ -	0	0
	FRANKLIN CO.	Frankfort	5/14/1995	Thunderstorm Wind	0 Knots		0	0	\$ 50,000.00	\$ -	0	0
26	FRANKLIN CO.	Frankfort	6/10/1995	Thunderstorm Wind	0 Knots		0	0	\$ -	\$ -	0	0
27	FRANKLIN CO.	FRANKFORT	5/5/1996	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
28	FRANKLIN CO.	FRANKFORT	9/16/1996	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
29	FRANKLIN (ZONE)		12/24/1997	High Wind	50 Knots		0	0	\$ 10,000.00	\$ -	0	0
30	FRANKLIN CO.	FRANKFORT	6/12/1998	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
31	FRANKLIN CO.	FRANKFORT	6/14/1998	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
32	FRANKLIN CO.	FRANKFORT	6/22/1998	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
33	FRANKLIN (ZONE)		2/7/1999	High Wind	No Data		0	0	\$ 1,000.00	\$ -	0	0
34	FRANKLIN CO.	FRANKFORT	7/10/2000	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
35	FRANKLIN CO.	FRANKFORT	8/9/2000	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
36	FRANKLIN CO.	FRANKFORT	10/5/2000	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
37	FRANKLIN CO.	FRANKFORT	11/9/2000	Thunderstorm Wind	70 Knots		0	0	\$ -	\$ -	0	0
38	FRANKLIN CO.	FRANKFORT	7/8/2001	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
39	FRANKLIN CO.	FRANKFORT	10/24/2001	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
40	FRANKLIN CO.	FRANKFORT	7/29/2002	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
41	FRANKLIN CO.	SWITZER	11/10/2002	Thunderstorm Wind	75 Knots		0	0	\$ 20,000.00	\$ -	0	0
42	FRANKLIN CO.	FRANKFORT	5/27/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
43	FRANKLIN CO.	FRANKFORT	5/30/2004	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	5/30/2004	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
44	FRANKLIN CO.	FRANKFORT	6/1/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
45	FRANKLIN CO.	FRANKFORT	6/13/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
46	FRANKLIN CO.	FRANKFORT	7/5/2004	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
47	FRANKLIN CO.	FRANKFORT	7/13/2004	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
48	FRANKLIN CO.	FRANKFORT	4/2/2006	Thunderstorm Wind	60 Knots		0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	COUNTYWIDE	4/2/2006	Thunderstorm Wind	50 Knots		0	0	\$ 10,000.00	\$ -	0	0
49	FRANKLIN CO.	COUNTYWIDE	5/25/2006	Thunderstorm Wind	50 Knots		0	0	\$ 20,000.00	\$ -	0	0
50	FRANKLIN CO.	FRANKFORT	8/20/2006	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
51	FRANKLIN CO.	FRANKFORT	4/3/2007	Thunderstorm Wind	59 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/3/2007	Thunderstorm Wind	70 Knots		0	0	\$ 50,000.00	\$ -	0	0
52	FRANKLIN CO.	POLSGROVE	8/16/2007	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
53	FRANKLIN CO.	FRANKFORT	1/29/2008	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
54	FRANKLIN CO.	FRANKFORT	7/20/2008	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
55	FRANKLIN (ZONE)		2/11/2009	High Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN (ZONE)		2/11/2009	High Wind	51 Knots		0	0	\$ -	\$ -	0	0
56	FRANKLIN CO.	FRANKFORT	2/27/2009	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
57	FRANKLIN (ZONE)		12/9/2009	High Wind	50 Knots		0	0	\$ -	\$ -	0	0
58	FRANKLIN CO.	FRANKFORT	10/26/2010	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
59	FRANKLIN CO.	FLAG FORK	2/28/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	SWALLOWFIELD	2/28/2011	Thunderstorm Wind	56 Knots		0	0	\$ 25,000.00	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
60	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/20/2011	Thunderstorm Wind	59 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/20/2011	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
61	FRANKLIN CO.	BENSON	5/23/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	BENSON	5/23/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FLAG FORK	5/23/2011	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
62	FRANKLIN CO.	STEDMANTOWN	8/13/2011	Thunderstorm Wind	52 Knots		0	0	\$ 15,000.00	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	8/13/2011	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
63	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	56 Knots		0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	JETT	1/17/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
64	FRANKLIN CO.	FRANKFT CPTL CITY AR	7/1/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FARMDALE	7/1/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
65	FRANKLIN CO.	PEAKS MILL	7/18/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
66	FRANKLIN CO.	HARVIELAND	7/26/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
67	FRANKLIN CO.	FRANKFORT	7/27/2012	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
68	FRANKLIN CO.	FRANKFORT	9/5/2012	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
69	FRANKLIN CO.	FRANKFORT	6/26/2013	Thunderstorm Wind	60 Knots		0	0	\$ -	\$ -	0	0
70	FRANKLIN CO.	PEAKS MILL	8/21/2013	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
71	FRANKLIN CO.	PEAKS MILL	10/31/2013	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
72	FRANKLIN CO.	BRIDGEPORT	12/21/2013	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	12/21/2013	Thunderstorm Wind	51 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	12/21/2013	Thunderstorm Wind	52 Knots		0	0	\$ 10,000.00	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	12/21/2013	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	12/21/2013	Thunderstorm Wind	71 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	LANES MILL	12/21/2013	Thunderstorm Wind	55 Knots		0	0	\$ -	\$ -	0	0
73	FRANKLIN CO.	PEAKS MILL	2/20/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
74	FRANKLIN CO.	FARMDALE	5/21/2014	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	LANES MILL	5/21/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
75	FRANKLIN CO.	FARMDALE	6/4/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
76	FRANKLIN CO.	JETT	6/20/2014	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	6/20/2014	Thunderstorm Wind	52 Knots		0	0	\$ 30,000.00	\$ -	0	0
77	FRANKLIN CO.	SWITZER	10/7/2014	Thunderstorm Wind	52 Knots		0	0	\$ 6,000.00	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
78	FRANKLIN CO.	STEDMANTOWN	5/11/2015	Thunderstorm Wind	56 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	JETT	5/11/2015	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
79	FRANKLIN CO.	CHOATEVILLE	6/26/2015	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
80	FRANKLIN CO.	SLICKWAY	7/10/2015	Thunderstorm Wind	52 Knots		0	0	\$ 10,000.00	\$ -	0	0
81	FRANKLIN CO.	FRANKFORT	7/13/2015	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
82	FRANKLIN CO.	CLOVERDALE	9/5/2015	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
83	FRANKLIN CO.	LANES MILL	12/23/2015	Thunderstorm Wind	55 Knots		0	0	\$ -	\$ -	0	0
84	FRANKLIN CO.	STEDMANTOWN	3/31/2016	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
85	FRANKLIN (ZONE)		4/2/2016	High Wind	60 Knots		0	0	\$ 2,000.00	\$ -	0	0
86	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/26/2016	Thunderstorm Wind	52 Knots		0	0	\$ 10,000.00	\$ -	0	0
87	FRANKLIN CO.	SLICKWAY	8/28/2016	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
88	FRANKLIN CO.	PEAKS MILL	9/10/2016	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	9/10/2016	Thunderstorm Wind	52 Knots		0	0	\$ 20,000.00	\$ -	0	0
89	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	53 Knots		0	0	\$ 25,000.00	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	3/1/2017	Thunderstorm Wind	55 Knots		0	0	\$ 150,000.00	\$ -	0	0
90	FRANKLIN CO.	LANES MILL	3/27/2017	Thunderstorm Wind	51 Knots		0	0	\$ -	\$ -	0	0
91	FRANKLIN CO.	FARMDALE	4/5/2017	Thunderstorm Wind	63 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	KENNEBEC	4/5/2017	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
92	FRANKLIN CO.	BRIDGEPORT	4/30/2017	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	4/30/2017	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
93	FRANKLIN CO.	FRANKFORT	6/18/2017	Thunderstorm Wind	53 Knots		0	0	\$ 15,000.00	\$ -	0	0
94	FRANKLIN CO.	BIG EDDY	5/31/2018	Thunderstorm Wind	54 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFT CPTL CITY AR	5/31/2018	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
95	FRANKLIN CO.	FRANKFORT	6/26/2018	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
96	FRANKLIN CO.	PEAKS MILL	7/2/2018	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
97	FRANKLIN CO.	CLOVERDALE	7/20/2018	Thunderstorm Wind	52 Knots		0	0	\$ 45,000.00	\$ -	0	0
	FRANKLIN CO.	LANES MILL	7/20/2018	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
98	FRANKLIN CO.	FRANKFORT	3/14/2019	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	HARVIELAND	3/14/2019	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0
99	FRANKLIN CO.	PEAKS MILL	6/5/2019	Thunderstorm Wind	53 Knots		0	0	\$ -	\$ -	0	0

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
100	FRANKLIN CO.	BIG EDDY	7/9/2020	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	7/9/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	KENNEBEC	7/9/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	7/9/2020	Thunderstorm Wind	52 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	7/9/2020	Thunderstorm Wind	51 Knots		0	0	\$ -	\$ -	0	0
101	FRANKLIN CO.	FRANKFT CPTL CITY AR	8/18/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	BIG EDDY	8/18/2020	Thunderstorm Wind	50 Knots		0	0	\$ -	\$ -	0	0
102	FRANKLIN CO.	FRANKFT CPTL CITY AR	6/11/2021	Thunderstorm Wind	57 Knots		0	0	\$ -	\$ -	0	0
	TOTALS:						0	0	\$ 6,594,500.00	\$ -	0	0

Franklin County/City of Frankfort Hail Events, Extent, and Impacts, 1964-2021

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN CO.		5/29/1982	Hail	2 Inches		0	0	\$ -	\$ -	0	0
2	FRANKLIN CO.		5/31/1982	Hail	1 Inch		0	0	\$ -	\$ -	0	0
3	FRANKLIN CO.		6/9/1982	Hail	1 Inch		0	0	\$ -	\$ -	0	0
4	FRANKLIN CO.		6/18/1992	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
5	FRANKLIN CO.	FRANKFORT	5/5/1996	Hail	2 Inches		0	0	\$ -	\$ -	0	0
6	FRANKLIN CO.	EVERGREEN	5/28/1996	Hail	1 Inch		0	0	\$ -	\$ -	0	0
7	FRANKLIN CO.	FRANKFORT	6/1/2004	Hail	1.5 Inches		0	0	\$ -	\$ -	0	0
8	FRANKLIN CO.	FRANKFORT	6/5/2007	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	6/5/2007	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
9	FRANKLIN CO.	FRANKFORT	5/21/2010	Hail	1 Inch		0	0	\$ -	\$ -	0	0
10	FRANKLIN CO.	FRANKFORT	4/23/2011	Hail	1 Inch		0	0	\$ -	\$ -	0	0
11	FRANKLIN CO.	FRANKFORT	7/19/2011	Hail	1 Inch		0	0	\$ -	\$ -	0	0
12	FRANKLIN CO.	CLOVERDALE	3/2/2012	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	FRANKFORT	3/2/2012	Hail	1.75 Inches		0	0	\$ -	\$ -	0	0
13	FRANKLIN CO.	PEAKS MILL	10/7/2014	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	PEAKS MILL	10/7/2014	Hail	1 Inch		0	0	\$ -	\$ -	0	0
14	FRANKLIN CO.	STEDMANTOWN	4/3/2015	Hail	1 Inch		0	0	\$ -	\$ -	0	0
15	FRANKLIN CO.	STEDMANTOWN	12/23/2015	Hail	1 Inch		0	0	\$ -	\$ -	0	0
16	FRANKLIN CO.	FRANKFORT	4/26/2016	Hail	1 Inch		0	0	\$ -	\$ -	0	0
17	FRANKLIN CO.	FRANKFT CPTL CITY AR	3/1/2017	Hail	1 Inch		0	0	\$ -	\$ -	0	0
18	FRANKLIN CO.	BRIDGEPORT	3/27/2017	Hail	1 Inch		0	0	\$ -	\$ -	0	0
	FRANKLIN CO.	STEDMANTOWN	3/27/2017	Hail	1 Inch		0	0	\$ -	\$ -	0	0
TOTALS:							0	0	\$ -	\$ -	0	0

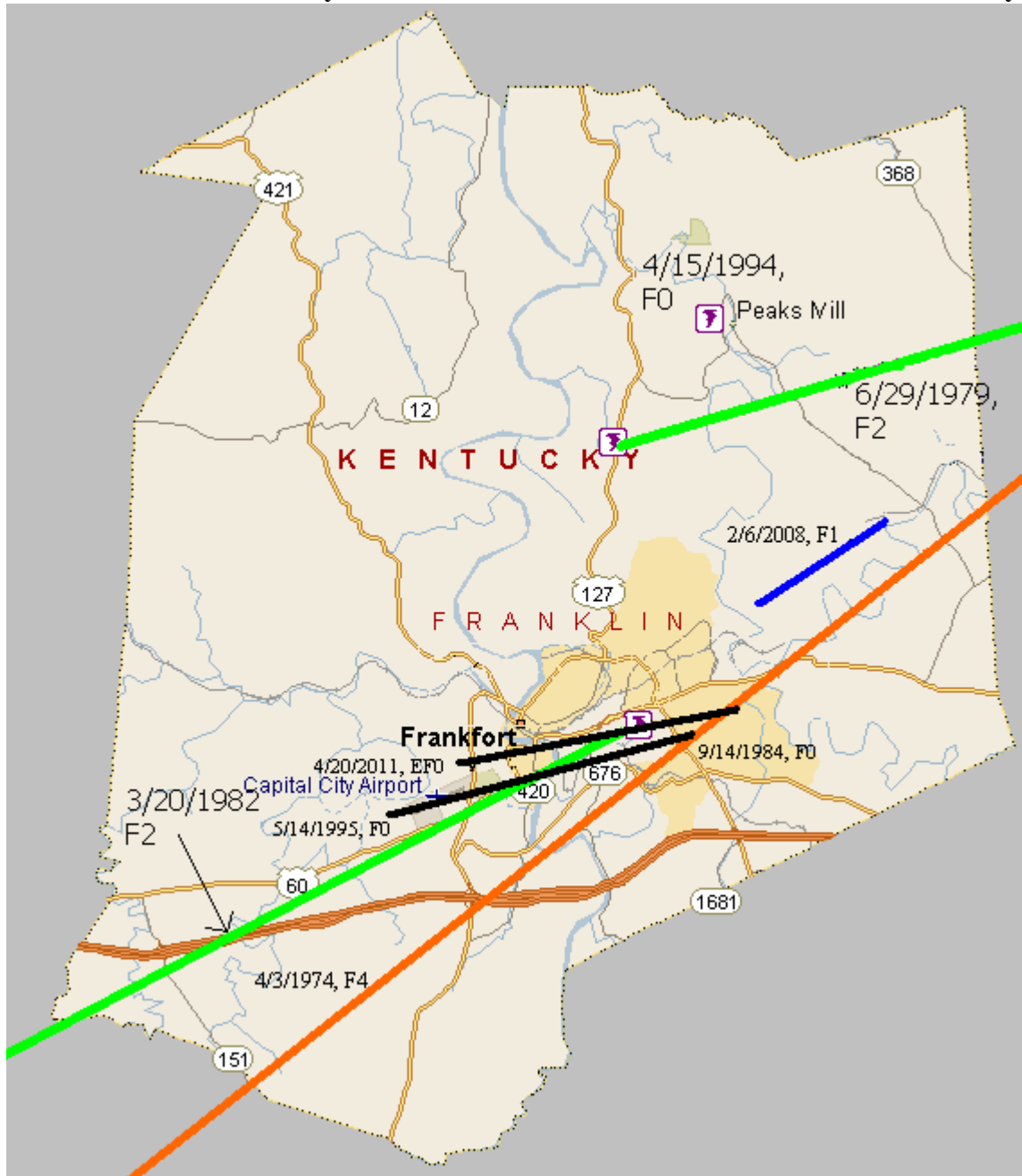
Franklin County/City of Frankfort Tornado Events, Extent, and Impacts, 1964-2021

Count	County	Location	Date	Type	Extent: Wind Speed or Hail Size	Extent: F/EF-Scale	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN CO.		3/25/1964	Tornado	N/A	F1	0	0	\$ 2,500.00	\$ -	0	0
2	FRANKLIN CO.		4/3/1974	Tornado	N/A	F4	4	85	\$ 250,000.00	\$ -	0	0
3	FRANKLIN CO.		6/29/1979	Tornado	N/A	F2	0	0	\$ 250.00	\$ -	0	0
4	FRANKLIN CO.		3/20/1982	Tornado	N/A	F2	0	0	\$ 2,500,000.00	\$ -	0	0
5	FRANKLIN CO.		9/14/1984	Tornado	N/A	F0	0	0	\$ 25,000.00	\$ -	0	0
6	FRANKLIN CO.	Frankfort	5/14/1995	Tornado	No Data		0	0	\$ -	\$ -	0	0
7	FRANKLIN CO.	STEDMANTOWN	2/6/2008	Tornado	N/A	EF1	0	0	\$ 250,000.00	\$250,000.00	0	0
8	FRANKLIN CO.	FRANKFT CPTL CITY AR	4/20/2011	Tornado	N/A	EF0	0	0	\$ -	\$ -	0	0
9	FRANKLIN CO.	CHOATEVILLE	12/6/2021	Tornado	N/A	EF1	0	0	\$ -	\$ -	0	0
	TOTALS:						4	85	\$ 3,027,750.00	\$250,000.00	0	0

Franklin County/City of Frankfort Tornado Events, Extent, Impacts, and Vulnerability (Length), 1964-2021

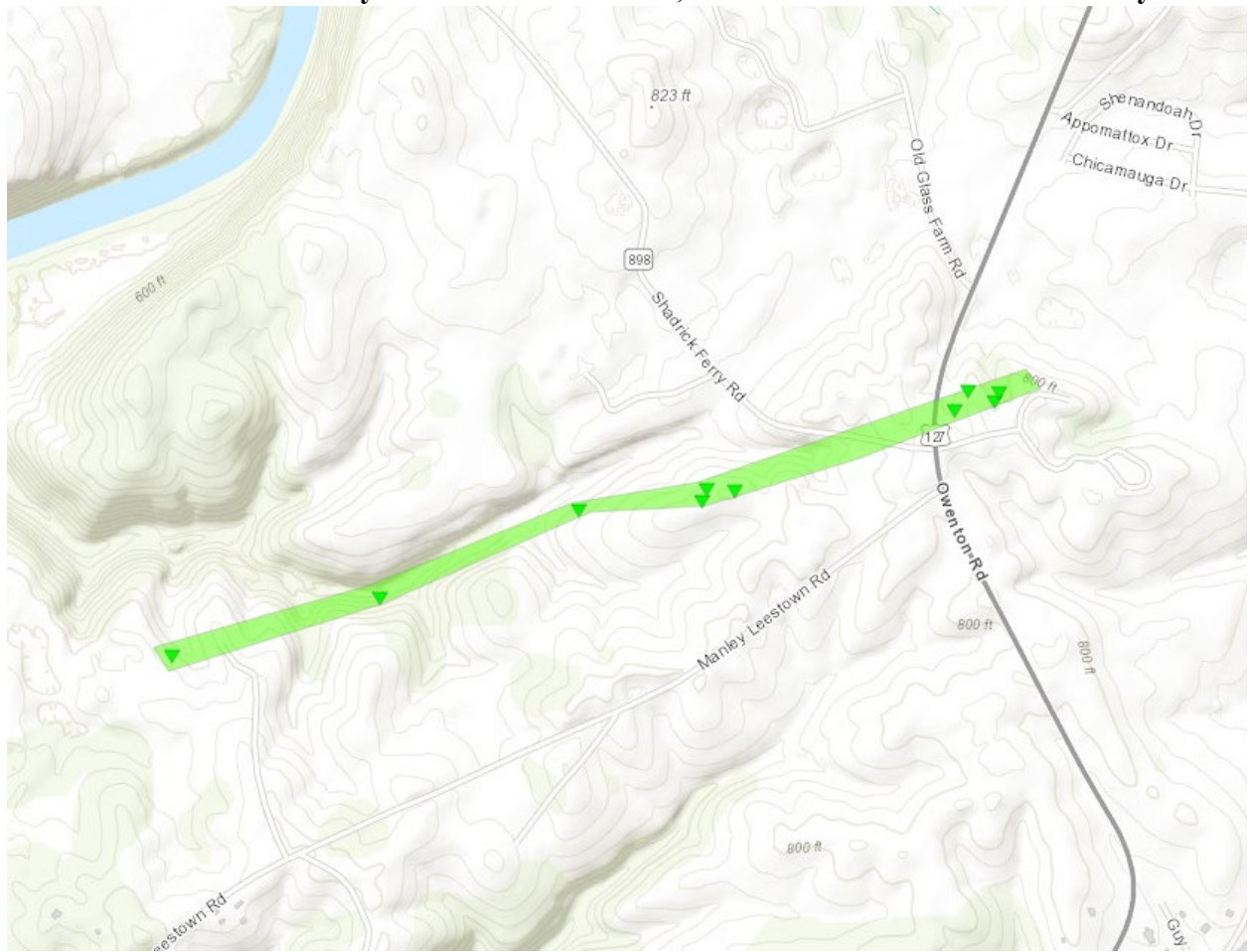
Date	Event Type	Tornado Scale	Deaths (Direct)	Injuries (Direct)	Tornado Length (Miles)
3/25/64	Tornado	F1	0	0	0.00
4/3/74	Tornado	F4	4	85	18.90
6/29/79	Tornado	F2	0	0	6.20
3/20/82	Tornado	F2	0	0	10.00
9/14/84	Tornado	F0	0	0	0.10
2/6/08	Tornado	EF1	0	0	2.44
4/20/11	Tornado	EF0	0	0	4.81
12/6/2021	Tornado	EF1	0	0	1.50

Location and Vulnerability: Paths for 1964²¹ – 2011 Tornadoes in Franklin County



²¹ The path for the March 25, 1964 tornado event is not available. Quoting the National Weather Service: “More research would be nice, to confirm its location and to get a better handle on path width and length.”

Location and Vulnerability: Path for December 6, 2021 Tornado in Franklin County



Extent for Tornadoes

This risk assessment will include both the Fujita-Pearson and the Enhanced Fujita Scale. The Fujita-Pearson Scale is included only for reference: Since 2007, the Enhanced Fujita Scale has been the standard by which to measure the extent of wind activity. However, Kentucky does contain dramatically different geographies within its boundaries. In discussing tornadic activity specifically, the mountainous eastern and southeastern Kentucky will have significantly less tornadic activity than central or western Kentucky. Resultingly, illustrating past events requires going back before 2007. Tornado path maps, for example, will reference the Fujita-Pearson Scale always in order to compare pre-2007 and post-2007 events.

The Enhanced Fujita Scale is a set of wind estimates (not measurements) based on damage. Its uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure. **Important:** The 3-second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one-minute mile" speed²².

The Enhanced Fujita Scale is summarized by National Weather Service (NWS) thusly:

Enhanced Fujita Scale		
Weak	EF-0	65-85 mph winds
	EF-1	86-110 mph winds
Strong	EF-2	111-135 mph winds
	EF-3	136-165 mph winds
Violent	EF-4	166-200 mph winds
	EF-5	>200 mph winds

²² This paragraph derives from NOAA: <https://www.spc.noaa.gov/faq/tornado/ef-scale.html>.

Fujita-Pearson Scale

Fujita Scale	Estimated Wind Speed (mph) (Fastest ¼-Mile)	3-Second Gust (mph)	Typical Damage
F0	< 73	45-78	<i>Light Damage:</i> Some damage to chimneys; branches broken off of trees; shallow-rooted trees pushed over; signboards damaged
F1	73-112	79-117	<i>Moderate Damage:</i> Peels surface off of roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	113-157	118-161	<i>Considerable Damage:</i> Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158-207	162-209	<i>Severe Damage:</i> Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown
F4	208-260	210-261	<i>Devastating Damage:</i> Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
F5	261-318	262-317	<i>Incredible Damage:</i> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur

Enhanced Fujita Scale

EF Number	3-Second Gust (mph)	Typical Damage
EF0	65-85	<u>Minor Damage:</u> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0
EF1	86-110	<u>Moderate Damage:</u> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken
EF2	111-135	<u>Considerable Damage:</u> Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
EF3	136-165	<u>Severe Damage:</u> Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged
EF4	166-200	<u>Devastating Damage:</u> Well-constructed and whole frame houses completely leveled; cars and other large objects thrown and small missiles generated
EF5	> 200	<u>Incredible Damage:</u> Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately one (1) mile (1.6 kilometers)

Extent for Straightline Wind

This risk analysis uses the Beaufort Wind Scale to discuss extent. The Beaufort Wind Scale is the scale upon which the National Weather Service (NWS) bases its categorization of “Thunderstorm Wind” and “High Wind” variables recorded in the National Center for Environmental Information (NCEI) Storm Events database.

Quoted from the National Weather Service: “One of the first scales to estimate wind speeds and the effects was created by Britain’s Admiral Sir Francis Beaufort (1774-1857). He developed the scale in 1805 to help sailors estimate the winds via visual observations. The scale starts with 0 and goes to a force of 12. The Beaufort scale is still used today to estimate wind strengths²³.”

Beaufort Wind Scale

Force	Speed (mph)	Speed (knots)	Description	Specifications
0	0-1	0-1	Calm	Calm; smoke rises vertically
1	1-3	1-3	Light Air	Direction of wind shown by smoke drift, but not by wind vanes
2	4-7	4-6	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind
3	8-12	7-10	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
4	13-18	11-16	Moderate Breeze	Raises dust and loose paper; small branches are moved
5	19-24	17-21	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters
6	25-31	22-27	Strong Breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty
7	32-38	28-33	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind
8	39-46	34-40	Gale	Breaks twigs off trees; generally impedes progress
9	47-54	41-47	Severe Gale	Slight structural damage occurs (chimney-pots and slates removed)
10	55-63	48-55	Storm	Seldom experienced inland; trees uprooted; considerable structural damage occurs
11	64-72	56-63	Violent Storm	Very rarely experienced; accompanied by wide-spread damage
12	72-83	64-71	Hurricane	See Saffir-Simpson Hurricane Scale

²³ See <https://www.weather.gov/mfl/beaufort>.

Extent for Hail

In defining its “Severe Thunderstorm” category for forecasting and recording events, the National Weather Service (NWS) cites an unnamed scale for conceptualizing the magnitude of hail:

National Weather Service (NWS) Guide for Determining Hail Sizes²⁴

Diameter	Conceptual Example
> 0.50 Inches	Pea
0.50 Inches	Marble/Mothball
0.75 Inches	Dime/Penny
0.88 Inches	Nickel
1.00 Inches	Quarter
1.25 Inches	Half Dollar
1.50 Inches	Walnut/Ping-Pong Ball
1.75 Inches	Golf Ball
2.00 Inches	Hen Egg
2.50 Inches	Tennis Ball
2.75 Inches	Baseball
3.00 Inches	Tea Cup
4.00 Inches	Grapefruit
4.50 Inches	Softball

²⁴ See <https://www.weather.gov/bgm/severedefinitions>.

The TORRO Hail Storm Intensity Scale (or the H-Scale) provides some additional illustration of the extent from hail. “The scale extends from H0 to H10 with its increments of intensity or damage potential related to hail size (distribution and maximum), texture, numbers, fall speed, speed of storm translation, and strength of the accompanying wind. The characteristic damage associated with each increment in Britain is listed in the table but may need to be modified for other countries to reflect differences in building materials and types; e.g. whether roofing tiles are predominantly slate, shingle or concrete.”

TORRO Hail Storm Intensity Scale (H-Scale)²⁵

Scale	Intensity Category	Typical Hail Diameter (mm)	Probable Kinetic Energy J m ⁻²	Typical Damage Impacts
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	5-15	> 20	Slight general damage to plants, crops
H2	Significant	10-20	> 100	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	> 300	Severe damage to fruit and crops; damage to glass and plastic structures; paint and wood scored
H4	Severe	25-40	> 500	Widespread glass damage; vehicle bodywork damage
H5	Destructive	30-50	> 800	Wholesale destruction of glass; damage to tiled roofs; significant risk of injuries
H6	Destructive	40-60		Bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75		Severe roof damage; risk of serious injuries
H8	Destructive	60-90		(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100		Extensive structural damage; risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	> 100		Extensive structural damage; risk of severe or even fatal injuries to persons caught in the open

As the TORRO H-Scale is British, its diameter measurements for hail are millimeters rather than in inches. So, by way of comparison to the NWS scale above, TORRO provides the following:

TORRO H-Scale Size Code Translation to Hail Descriptors

Size code	Maximum diameter (mm)	Description
0	5-9	Pea
1	10-15	Mothball
2	16-20	Marble, Grape
3	21-30	Walnut
4	31-40	Pigeon's Egg > Squash ball
5	41-50	Golf Ball > Pullet's Egg
6	51-60	Hen's egg
7	61-75	Tennis Ball > Cricket ball
8	76-90	Large Orange > Soft ball
9	91-100	Grapefruit
10	> 100	Melon

²⁵ See <https://www.torro.org.uk/research/hail/hscale>.

A Statement of Vulnerability to Severe Thunderstorms

It is assumed for Franklin County and for the City of Frankfort that all of the critical facilities identified toward the end of this plan document are under threat equally from a severe thunderstorm event.

Severe Winter Storms

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

A. Types of Winter Storms: “Winter Storms” themselves are a category: “A winter storm is a combination of heavy snow, blowing snow and/or dangerous wind chills. A winter storm is life-threatening²⁶.”

1. Blizzards

Blizzards are by far the most dangerous of all winter storms. They are characterized by temperatures below twenty degrees Fahrenheit and winds of at least 35 miles per hour. In addition to the temperatures and winds, a blizzard must have a sufficient amount of falling or blowing snow. The snow must reduce visibility to one quarter of a mile or less for at least three hours. With high winds and heavy snow, these severe storms can punish residents throughout much of the United States during the winter months each year. In mid-March of 1993, a major blizzard struck the Eastern U.S., including parts of Kentucky.

2. Heavy Snowstorm

Heavy snows have the capacity to immobilize a region and paralyze a city, slowing the flow of supplies, and disrupting emergency and medical services. Accumulations of snow may collapse buildings and knock down trees and power lines. Homes and farms in rural areas may be isolated for days and unprotected livestock may be lost. The cost of snow removal, repairing damages, and loss of business can have enormous economic impacts on cities and towns.

3. Ice Storm

An ice storm occurs when freezing rain falls from clouds and freezes immediately on impact. Ice storms occur when cold air at the surface is overridden by warm, moist air at higher altitudes. As the warm air advances and is lifted over the cold, precipitation begins falling as rain at high altitudes, then, as it is super cooled, freezes upon contact with chilled surfaces at temperatures of 32 degrees Fahrenheit or below. In extreme cases, ice may accumulate inches thick, though just a thin coating is often enough to do severe damage.

²⁶ See <https://www.nssl.noaa.gov/education/svrwx101/winter/types/>.

B. Impact of Winter Storms

Storm effects such as power outages, extreme cold, flooding, and snow accumulation can cause hazardous conditions and hidden problems for people in affected areas.

1. Power Outages

Snow and ice accumulation on trees can cause branches and trunk to break and fall on to vulnerable power lines causing blackouts varying in size from one street to an entire city. In turn, a population may be even more vulnerable to other effects such as extreme cold.

2. Extreme Cold

With the occurrence of extremely cold temperatures comes the risk of frozen water mains and pipes, potentially damaged car engines, and, in extreme cases, prolonged exposure to cold resulting in frostbite.

3. Flooding

After precipitation has mounted and temperatures rise once again, snow and ice melts and, depending on the amount of total precipitation, flooding can occur. In turn, as more snow and ice accumulate the threat of flooding increases.

4. Snow and Ice Accumulation on Roadways

This can cause severe transportation problems in the form of extremely hazardous roadway conditions that encourage loss of controls of vehicles, collisions, and roadways and interstate closures.

C. Historical Winter Storm Data

See table on following page

Franklin County and the City of Frankfort Winter Storm Events, Type, and Impacts, 1996-2021

Count	Location: County	Date	Type	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
1	FRANKLIN (ZONE)	1/6/1996	Heavy Snow	0	0	\$ -	\$ -	0	0
2	FRANKLIN (ZONE)	2/4/1998	Heavy Snow	0	0	\$ -	\$ -	0	0
3	FRANKLIN (ZONE)	2/15/2003	Ice Storm	0	0	\$ 100,000.00	\$ -	0	0
4	FRANKLIN (ZONE)	12/22/2004	Ice Storm	0	0	\$ -	\$ -	0	0
5	FRANKLIN (ZONE)	2/11/2008	Winter Storm	0	0	\$ -	\$ -	0	0
	FRANKLIN (ZONE)	2/21/2008	Ice Storm	0	0	\$ -	\$ -	0	0
6	FRANKLIN (ZONE)	3/7/2008	Heavy Snow	0	0	\$ -	\$ -	0	0
7	FRANKLIN (ZONE)	12/15/2008	Winter Storm	0	0	\$ -	\$ -	0	0
8	FRANKLIN (ZONE)	1/7/2010	Winter Storm	0	0	\$ -	\$ -	0	0
9	FRANKLIN (ZONE)	2/9/2010	Heavy Snow	0	0	\$ -	\$ -	0	0
10	FRANKLIN (ZONE)	2/15/2010	Heavy Snow	0	0	\$ -	\$ -	0	0
11	FRANKLIN (ZONE)	12/4/2010	Heavy Snow	0	0	\$ -	\$ -	0	0
12	FRANKLIN (ZONE)	12/16/2010	Winter Storm	0	0	\$ -	\$ -	0	0
13	FRANKLIN (ZONE)	1/20/2011	Heavy Snow	0	0	\$ -	\$ -	0	0
14	FRANKLIN (ZONE)	3/4/2012	Heavy Snow	0	0	\$ -	\$ -	0	0
15	FRANKLIN (ZONE)	12/28/2012	Heavy Snow	0	0	\$ -	\$ -	0	0
16	FRANKLIN (ZONE)	2/2/2014	Heavy Snow	0	0	\$ -	\$ -	0	0
17	FRANKLIN (ZONE)	2/4/2014	Winter Storm	0	0	\$ -	\$ -	0	0
18	FRANKLIN (ZONE)	3/2/2014	Winter Storm	0	0	\$ -	\$ -	0	0
19	FRANKLIN (ZONE)	2/16/2015	Heavy Snow	0	0	\$ -	\$ -	0	0
20	FRANKLIN (ZONE)	3/4/2015	Heavy Snow	0	0	\$ -	\$ -	0	0
21	FRANKLIN (ZONE)	1/22/2016	Heavy Snow	0	0	\$ -	\$ -	0	0
22	FRANKLIN (ZONE)	2/14/2016	Heavy Snow	0	0	\$ -	\$ -	0	0
23	FRANKLIN (ZONE)	1/12/2018	Winter Storm	0	0	\$ -	\$ -	0	0
24	FRANKLIN (ZONE)	1/16/2018	Winter Storm	0	0	\$ -	\$ -	0	0
25	FRANKLIN (ZONE)	2/10/2021	Winter Storm	0	0	\$ -	\$ -	0	0
26	FRANKLIN (ZONE)	2/14/2021	Winter Storm	0	0	\$ -	\$ -	0	0
TOTALS:				0	0	\$ 100,000.00	\$ -	0	0

Franklin County and the City of Frankfort Winter Storm Extent and Impacts, 1996-2021

Count	Location: County	Date	Type	Extent, Impact: Event Narrative
1	FRANKLIN (ZONE)	1/6/1996	Heavy Snow	
2	FRANKLIN (ZONE)	2/4/1998	Heavy Snow	
3	FRANKLIN (ZONE)	2/15/2003	Ice Storm	
4	FRANKLIN (ZONE)	12/22/2004	Ice Storm	
5	FRANKLIN (ZONE)	2/11/2008	Winter Storm	Three to 4 inches of snow fell during the evening of the 11th. Freezing rain early on the 12th coated trees. A branch falling on a power line in Frankfort caused a power outage to several neighborhoods.
	FRANKLIN (ZONE)	2/21/2008	Ice Storm	One quarter of an inch of ice accumulated.
6	FRANKLIN (ZONE)	3/7/2008	Heavy Snow	
7	FRANKLIN (ZONE)	12/15/2008	Winter Storm	Observers reported variable amounts of 2 to 4 inches of snow around Frankfort.
8	FRANKLIN (ZONE)	1/7/2010	Winter Storm	Two to 4 inches of snow in Frankfort and countywide caused numerous accidents and travel delays.
9	FRANKLIN (ZONE)	2/9/2010	Heavy Snow	Between 4 and 5 inches of snow fell countywide.
10	FRANKLIN (ZONE)	2/15/2010	Heavy Snow	Snowfall totals varied from 4 to 7 inches from south to north across the county.
11	FRANKLIN (ZONE)	12/4/2010	Heavy Snow	Four to 5 inches of snow fell near Frankfort, Kentucky.
12	FRANKLIN (ZONE)	12/16/2010	Winter Storm	One to 2 inches of snow fell during the early morning hours. This changed to sleet and freezing rain with additional ice accumulations of around one quarter of an inch.
13	FRANKLIN (ZONE)	1/20/2011	Heavy Snow	Four inches of snow accumulated just outside of Frankfort.
14	FRANKLIN (ZONE)	3/4/2012	Heavy Snow	Multiple CoCoRaHS observers reported 5 to 6 inches of snow across the southern half of Franklin County, with lesser amounts to the north.
15	FRANKLIN (ZONE)	12/28/2012	Heavy Snow	Several reports of snowfall totaling between 3 and 4 inches arrived from north of Frankfort.
16	FRANKLIN (ZONE)	2/2/2014	Heavy Snow	A resident just south of Frankfort measured 5.5 inches of snow.
17	FRANKLIN (ZONE)	2/4/2014	Winter Storm	One quarter of an inch of ice was measured on elevated surfaces in Frankfort. The ASOS ice accretion sensor at Frankfort measured 0.31 inches of ice.
18	FRANKLIN (ZONE)	3/2/2014	Winter Storm	An observer just west of Frankfort measured just under 3 inches of sleet and snow. Of this amount, over one half inch fell as sleet.
19	FRANKLIN (ZONE)	2/16/2015	Heavy Snow	Around 9 inches of snow fell across the county.
20	FRANKLIN (ZONE)	3/4/2015	Heavy Snow	In Frankfort, 18.5 inches of snow fell.
21	FRANKLIN (ZONE)	1/22/2016	Heavy Snow	Between 5 and 7 inches of snow fell across the county.
22	FRANKLIN (ZONE)	2/14/2016	Heavy Snow	Between 4 and 5 inches of snow fell across the county.
23	FRANKLIN (ZONE)	1/12/2018	Winter Storm	The combination of 2 to 4 inches of snow and 0.10 to 0.15 inches of ice resulted in difficult to dangerous driving conditions across the county.
24	FRANKLIN (ZONE)	1/16/2018	Winter Storm	Between 3 and 5 inches of snow fell across the county.
25	FRANKLIN (ZONE)	2/10/2021	Winter Storm	Between a quarter inch and a half inch of ice accumulated in Frankfort, KY and surrounding areas. 0.3 inches of sleet also fell on top of the ice.
26	FRANKLIN (ZONE)	2/14/2021	Winter Storm	Around 1 inch of sleet accumulated in Franklin County, KY followed by 2.7 inches of snow.

Probability for Winter Storms as a Function of Previous Occurrences

For all events comprising the definition used here for a “winter storm” (i.e., “winter storm,” heavy snow, blizzard, and ice storm), Franklin County and the City of Frankfort have experienced 26 discrete events from 1996 to 2021. Given the date range includes an event that occurred in January of the first year in the period-of-record and allowing the end of December of 2021 to be the endpoint, this analysis assumes a full 26 years or 312 months as the period-of-record.

Franklin County and the City of Frankfort, then, experienced 26 discrete “winter storm” events over 26 years or over 312 months.

Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) “winter storm” event every year (i.e., 26/26). Stated differently, Franklin County and the City of Frankfort experienced and, thus, can be expected to experience in the future one (1) “winter storm” event every 12 months (i.e., $[1/(26/312)] = 12$).

A Statement of Vulnerability to Winter Storms

It is assumed for Franklin County and for the City of Frankfort that all of the critical facilities identified toward the end of this plan document are under threat equally from a winter storm as defined through the National Weather Service’s use of the term “winter storm,” and/or through heavy snow, a blizzard, or an ice storm.

Wildfires

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed and spread quickly and are usually signaled by dense smoke that fills the area for miles around. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires.

A Wildland Fire²⁷ is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. Wildland fires have been occurring in Kentucky for thousands of years. Unfortunately, these fires began to threaten

homes and communities prompting the need to suppress wildfires and establish forest protection laws. The first forest protection laws were enacted in 1831 in a few specific counties with heavily wooded areas. The fine and penalty for setting a fire was \$20. Today, Kentucky's forest protection laws include much stiffer penalties for intentionally setting a fire on land owned by another (Kentucky Revised Statute, Chapter 149, Section 380). Penalties for violating KRS 149.380 include a fine of not less than \$1,000 or more than \$10,000, imprisonment for not more than five years, or both fine and imprisonment.

An Urban Wildland Interface Fire is a wildfire in a geographic area where structures and other human development meet or intermingle with wildland or vegetative fuels. Areas that have experienced prolonged droughts, or are excessively dry, are at risk of wildfires. People start more than four out of every five wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a factor, in that it expresses the pattern of vegetative growth and open areas. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity, and wind (both short and long term) affect the severity and duration of wildfires.

According to Kentucky Division of Forestry (KDF), wildfires are categorized into “Classes.” These “Classes,” then, represent types of wildfires and also represent an illustration of “extent,” i.e., a measurement of how bad a wildfire can get, preferably in terms of a scale. Below are “Class” distinctions between types of wildfires and the definition-cum-extent that determine each Class.

²⁷ The following description derives from the Kentucky Division of Forestry (KDF). See: <https://eec.ky.gov/Natural-Resources/Forestry/wildland-fire-management/Pages/default.aspx> [Last Accessed 3/1/2022].

According to Kentucky Division of Forestry (KDF), wildfires are categorized into “Classes.” These “Classes,” then, represent types of wildfires and also represent an illustration of “extent,” i.e., a measurement of how bad a wildfire can get, preferably in terms of a scale. Below are “Class” distinctions between types of wildfires and the definition-cum-extent that determine each Class.

Classes of Wildfire as Distinguished by Acres Burned

Class A	Less than 0.25 Acres Burned
Class B	0.26 to 9 Acres Burned
Class C	10 to 99 Acres Burned
Class D	100 to 299 Acres Burned
Class E	300 to 999 Acres Burned
Class F	1,000 to 4,999 Acres Burned
Class G	5,000 or More Acres Burned

From January 1, 2013 until December 31, 2021, there have been the following number of wildfires in each Class for Franklin County and the City of Frankfort. The number of wildfires is accompanied by the acreage burned and the percent of the total each Class comprised:

Summary of Fire Occurrences, Extent, January 1, 2013 – December 31, 2021

Fire Class	Class Descriptor	# Fires	Acreage Burned	% of Total Fire Type
Class A	>0.25 Acres	0	0	0.0%
Class B	0.25 to 9 Acres	0	0	0.0%
Class C	10 to 99 Acres	1	10.0	100.0%
Class D	100 to 299 Acres	0	0	0.0%
Class E	300 to 999 Acres	0	0	0.0%
Class F	1,000 to 4,999 Acres	0	0	0.0%
Class G	5,000 or More Acres	0	0	0.0%

Location and Previous Occurrences

Below is a map of the locations of all wildfire events to be recorded by Kentucky Division of Forestry (KDF) from January 1, 2013 – August 2018. This map derives from the Commonwealth of Kentucky Enhanced Hazard Mitigation Plan 2018. It is relevant for this analysis because the only wildfire event recorded by Kentucky Division of Forestry for Franklin County (and the City of Frankfort) between 2013 and 2021 was recorded in 2014.

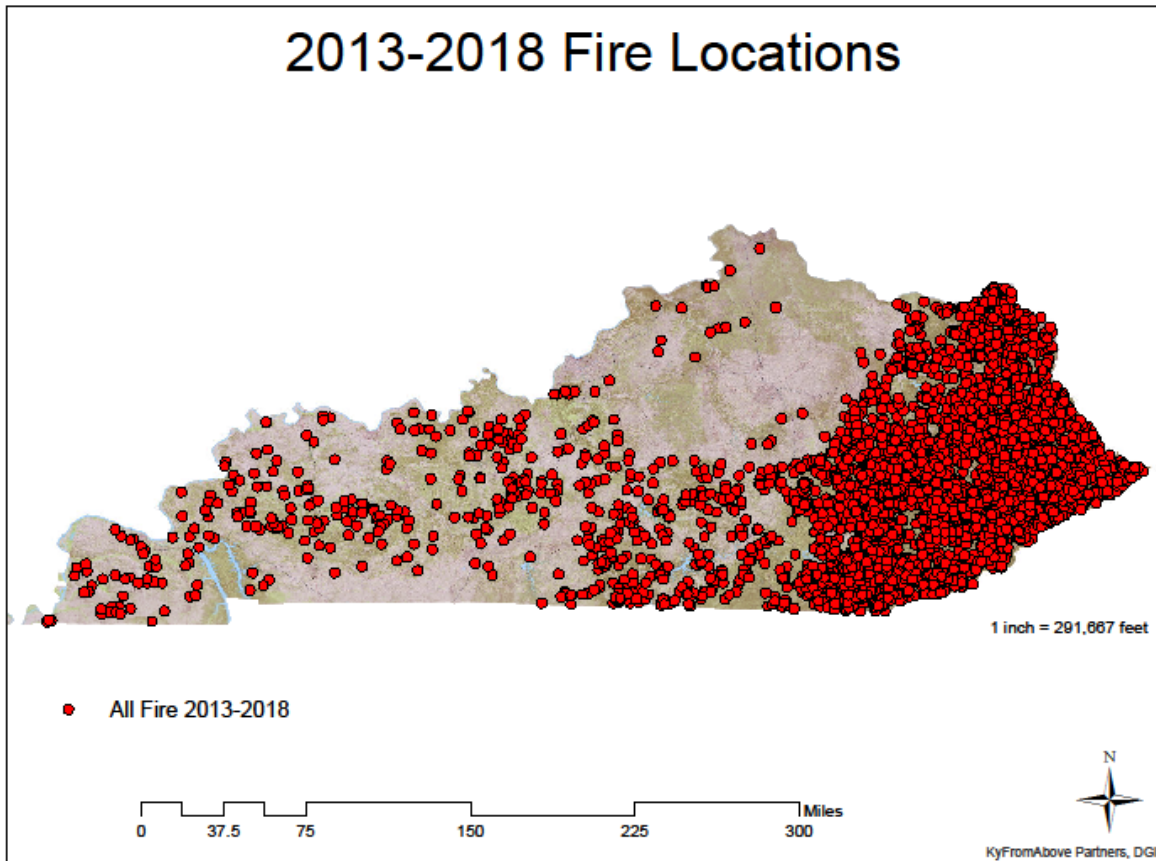


Figure 3: Map. Wildfire Event Locations, 2013-2018

Location, Previous Occurrences, Extent, Vulnerability

The following tables summarizing locations, previous occurrences, extent, and vulnerability are organized by “Region.” “Regions” refer to Kentucky Division of Forestry (KDF) Regional Office locations. Below is a map for reference.

The purpose of this map in terms of illustrating risk for local governments is that it is evidence that Kentucky Division of Forestry data (i.e., the best available data) is collected at the county level in accordance with organization of the division by regions defined by counties. In this case, Franklin County data is synonymous with Franklin County and the City of Frankfort data.



Kentucky Division of Forestry Regional Office Locations

West Region

P.O. Box 465
Madisonville, KY 42431
Phone: 270-824-7527
Fax: 270-824-7593
Seedlings: 270-247-3913

North Central Region

P.O. Box 516
Frankfort, KY 40601
Phone: 502-573-1085
Fax: 502-573-1088

Northeast Region

255 Rodburn Hollow Rd.
Morehead, KY 40351
Phone: 606-783-8625
Fax: 606-783-8628



Central Region

120 Gaines Drive
Campbellsville, KY 42718
Phone: 270-465-5071
Fax: 270-465-3575

Southeast Region

154 Grand Vue Plaza
Hazard, KY 41701
Phone: 606-435-6073
Fax: 606-435-6075

Figure 4: Map. KDF Regions for Reference

Franklin County and the City of Frankfort (North Central Region)

Wildfire Location, Occurrences, Extent, Vulnerability, January 1, 2013 – December 31, 2021

<u>County</u>	<u>Year</u>	<u># of Fires</u>	<u># Acres Burned</u>	<u># Acres Vulnerable</u>
Franklin	2014	1	10.0	39,530

The one (1) wildfire event that has occurred in Franklin County and for the City of Frankfort burned ten (10) acres total, seven (7) acres of which were open acres and three (3) acres of which were wooded. The fire occurred on private commercial forest land and was caused by debris.

Probability as a Function of Previous Occurrences

A cursory glance at the tables that have already been produced gives a clear picture of probability.

From tables above, we see that of all Classes of wildfire, Franklin County and the City of Frankfort is most likely to have 10 to 99 acres burnt in a single event.

The number of discrete wildfire events for Franklin County and the City of Frankfort since 2013 (i.e., over a nine-year period) have broken down as such:

Number of Wildfire Events per Year, Franklin County, and the City of Frankfort, 2013 - 2021

Year	Number of Wildfire Events Recorded by KDF
2013	0 Events
2014	1 Events
2015	0 Events
2016	0 Events
2017	0 Events
2018	0 Events
2019	0 Events
2020	0 Events
2021	0 Events
TOTAL	1 Event

Probability, then, expressed as an annual frequency of occurrence, Franklin County and the City of Frankfort can prepare to experience on average one (1) wildfire event every nine (9) years or that there is an 11.11% probability of Franklin County and the City of Frankfort experiencing a wildfire event in a given year.

Impacts

From January 1, 2013 to December 31, 2021, Franklin County and the City of Frankfort suffered one (1) wildfire event. From this one (1) wildfire event, ten (10) acres were burned. Of the ten (10) acres burned, seven (7) acres of were “open” acres and three (3) acres were wooded. The fire occurred on private commercial forest land and was caused by debris.

The following impacts were suffered because of this one (1) wildfire event:

- Total Suppression Cost²⁸: \$165.00
- Average Cost Per Fire: \$165.00
- Average Cost Per Acre: \$16.50
- Number of Saved Structures: 0
- Value of Saved Structures: \$0.00
- Number of Lost Structures: 0
- Value of Lost Structures: \$0.00
- Improvements Saved: \$0.00
- Improvements Lost: \$0.00
- Number of Saved Houses: 0
- Value of Saved Houses: \$0.00
- Number of Lost Houses: 0
- Value of Lost Houses: \$0.00

Vulnerability

To address the vulnerability to wildfires for Franklin County and for the City of Frankfort, the Bluegrass Area Development District multi-jurisdictional, multi-hazard mitigation plan will rely on the Kentucky Division of Forestry’s “Kentucky Forest Action Plan 2020.”²⁹

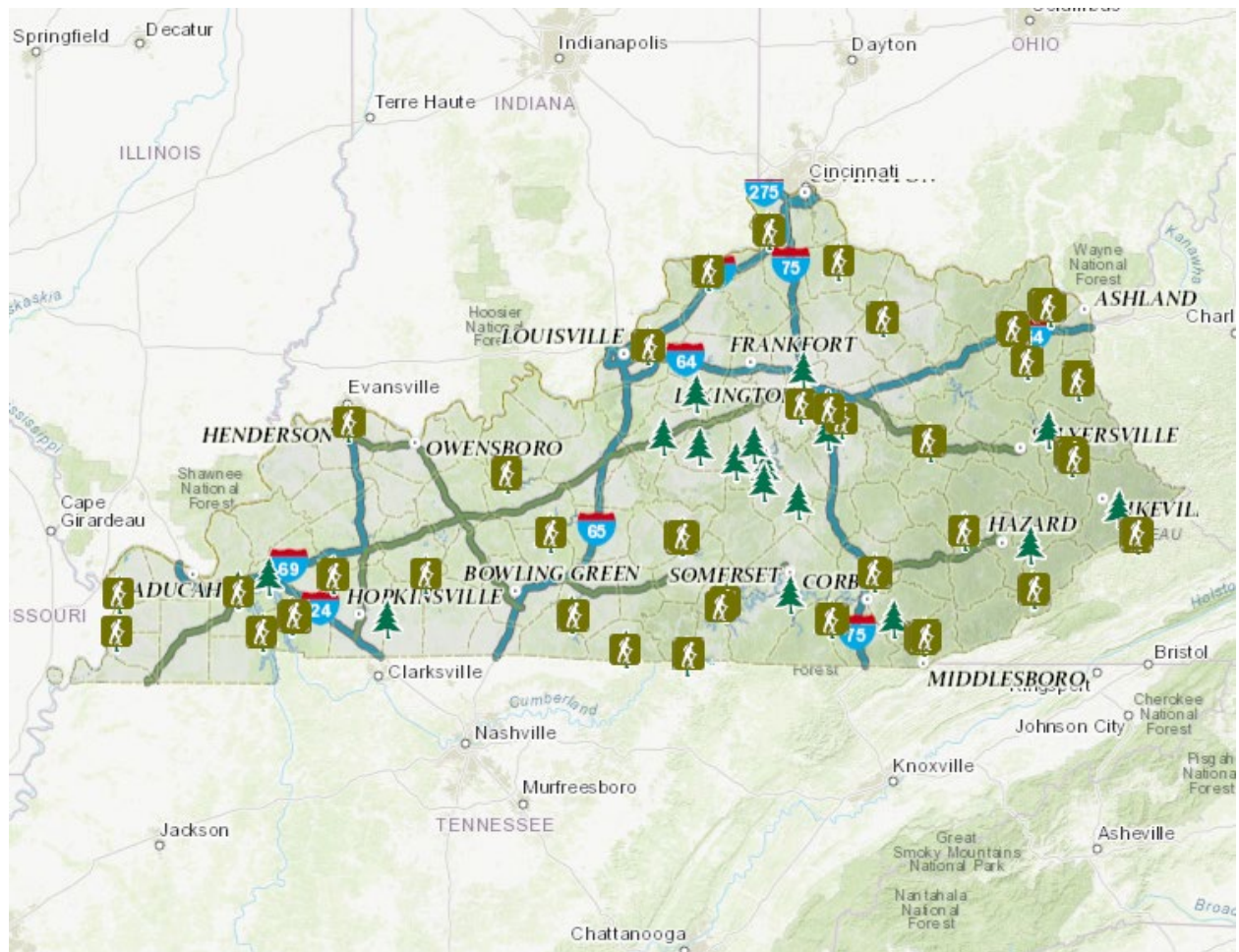
As a matter of context or to anchor the vulnerability to wildfire specifically for Franklin County and for the City of Frankfort consider that one of the most obvious proxies for said vulnerability would be to identify the locations of Kentucky’s state parks. Arguably, in and around Kentucky state parks will be areas of vulnerability to the wildfire hazard with assets that create significant impacts if confronted with a wildfire.

Below is a graphic illustrating the location of Kentucky’s state parks. Note that the tree icon represents the park, and the hiking person icon represents trail heads.

²⁸ The suppression cost may not reflect the full value of the cost. The cost of suppressing this one (1) wildfire event in Franklin County and the City of Frankfort was collected from the party responsible for the fire by the proper enforcement agency per Kentucky Revised Statute (KRS) §149.180. This analysis assumes that value of the suppression is synonymous with the amount charged to the party responsible for the fire. It is not known whether the full cost of suppression is reflected in the fee charged to the party responsible for the fire.

²⁹ The Kentucky Division of Forestry “Kentucky Forest Action Plan 2020” can be found here: <https://eec.ky.gov/Natural-Resources/Forestry/Pages/Kentucky%27s-Forest-Action-Plan.aspx> [Last accessed 3/2/2022]

Illustration of Location of State Parks



Note that the City of Frankfort (and Franklin County) is not within the immediate proximity of a Kentucky state park or trailhead.

Rather, Franklin County and the City of Frankfort’s vulnerability to wildfire derives primarily from the danger to privately-owned “commercial forest land,” i.e., rural farmland and assets.

That said, the Kentucky Division of Forestry’s “Kentucky Forest Action Plan 2020” does identify generally an area within Franklin County and near the City of Frankfort that would be particularly vulnerable to wildfire:

Specifically, the “Kentucky Forest Action Plan 2020” identifies “Forest Legacy Areas” or FLAs that “are subsets within Kentucky’s larger priority areas to provide comprehensive identification of key forest resources in Kentucky. The FLAs were first developed in conjunction with the Forest Legacy Assessment of Need in 2003 to identify environmentally important forests for protection from conversion to non-forest uses (p. 89).

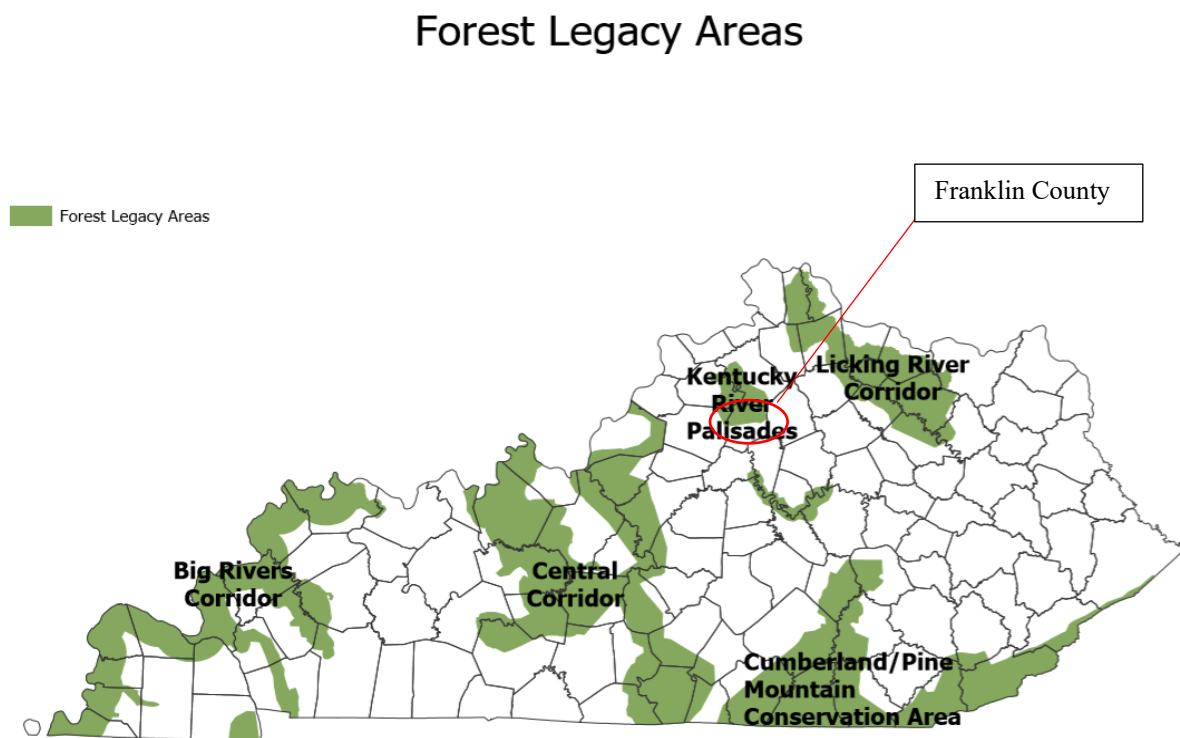
One of these FLAs is the Kentucky River Palisades.

The Kentucky River Palisades is the last remaining large, forested remnant in the Bluegrass area. It houses a large concentration rare plant that include the federally listed Running Buffalo Clover and that include two (2) other candidates for federal listing as threatened or endangered species. The Kentucky River Palisades houses unique archaeological sites and historic buffalo hunting grounds. They also generally are threatened by urban expansion (p. 90).

A portion of the Kentucky River Palisades dips into the top half of Franklin County toward the City of Frankfort.

See the below map:

Forest Legacy Areas (from the “Kentucky Forest Action Plan 2020”)



Related to the Forest Legacy Area (FLA) designation is the requirement by Kentucky's Division of Forestry to identify priority areas for the distribution of forestry resources (that include mitigation needs). Hence, the development of the "Kentucky Forest Action Plan 2020." Specifically, "[t]he Cooperative Forestry Assistance Act (CFAA) provides the authorities for a broad range of state and private forestry programs. As amended by the 2008 Farm Bill, the CFAA requires each state forestry agency to develop a 'Statewide Assessment and Strategies for Forest Resources,' collectively referred to as State Forest Action Plan (SFAP), to be eligible to receive funds under the authorities of the Act... (p. 85)."

Thus, the "Kentucky Forest Action Plan 2020" identified a prioritization methodology ("based upon the framework developed by the Southern Forest Land Assessment"). Prioritization was based on 13 variables, ten (10) defining resource "richness" and three (3) representing threats to the forest resource.

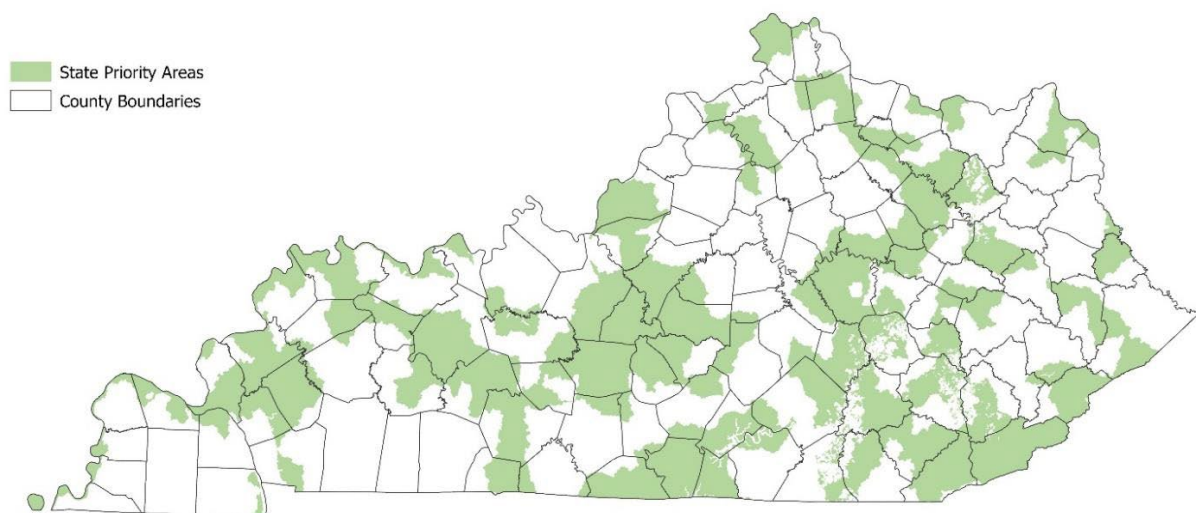
"Richness" was defined through "forestland," "riparian areas," "public drinking water," "priority watersheds," "forest patches," "site productivity," "forested wetlands," "threatened and endangered species," "proximity to public land," and "slope" variables from spatial datasets.

"Threat" (to the Forest Resource) was defined through "development level," "forest health," and, most relevantly here, "wildfire risk" variables, again, as captured via spatial datasets.

The 13 variables were then weighted using the "Analytic Hierarchy Process" (AHP) methodology.

From that methodology (and after designating watersheds as a separate automatic priority and removing federal lands from the spatial datasets), the following map of "Kentucky Forest Priority Areas" was produced:

Kentucky Forest Priority Area (from the "Kentucky Forest Action Plan 2020")



Finally, and addressing the City of Frankfort specifically, the Kentucky Division of Forestry “Kentucky Forest Action Plan 2020” identifies “Urban Forest Priority Areas”:

“To address urban forestry issues, an analysis of population and canopy cover was conducted. This analysis resulted in the identification of three priority areas: Urban Priority Area, Developing Interface Priority Area, and Rural Interface Priority Area (p. 91).”

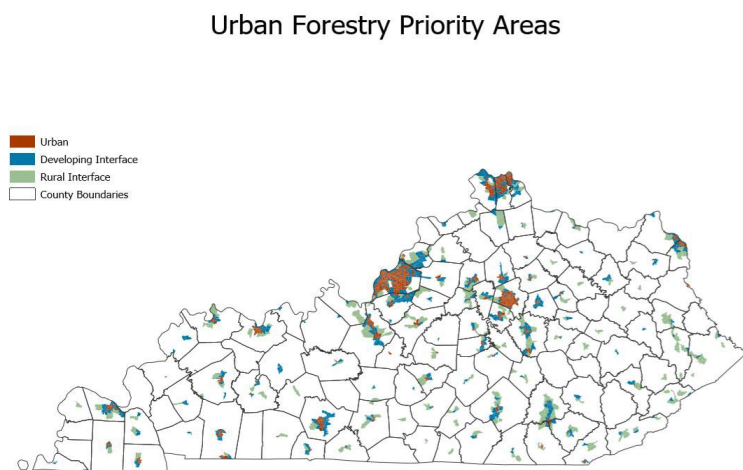
“Urban Priority Area,” “Developing Interface Priority Area,” and “Rural Interface Priority Area” are defined as follows:

“The ‘Urban Priority Area’ is characterized by population greater than 1,000 residents per square mile. Average tree canopy is 18% in urban areas of Kentucky.

“The ‘Developing Interface Priority Area’ is characterized by population of 300 to 999 residents per square mile. These areas are typically located next to the Urban Priority Areas and are impacted by development pressures. Average tree canopy cover is 32% in these areas of Kentucky.

“The ‘Rural Interface Priority Area’ is characterized by population of 150 to 299 residents per square mile. These areas are typically located between the Developing Interface Priority Area and surrounding rural areas... (p. 91).”

Following is a map of the Urban Forestry Priority Areas of Kentucky and their three abovementioned distinctions color-coded. Franklin County is noted.



Note that the “Urban Priority Area” and the “Developing Interface Priority Area” within Franklin County concentrates around the City of Frankfort.

Finally, the Kentucky Geological Survey (KGS) in 2005 produced its “Generalized Geologic Map for Land-Use Planning: Franklin County, Kentucky³⁰.”

In this map/report was the below image that seems appropriate for visualizing wildfire vulnerability for the City of Frankfort. According to the caption in the report, this image was taken looking west at the State Capitol in the City of Frankfort from the Frankfort Cemetery.

View of City of Frankfort from the Frankfort Cemetery



The 2005 Kentucky Geological Survey “Generalized Geologic Map for Land-Use Planning: Franklin County, Kentucky” alludes to two (2) specific sites for which vulnerability to wildfire is notable:

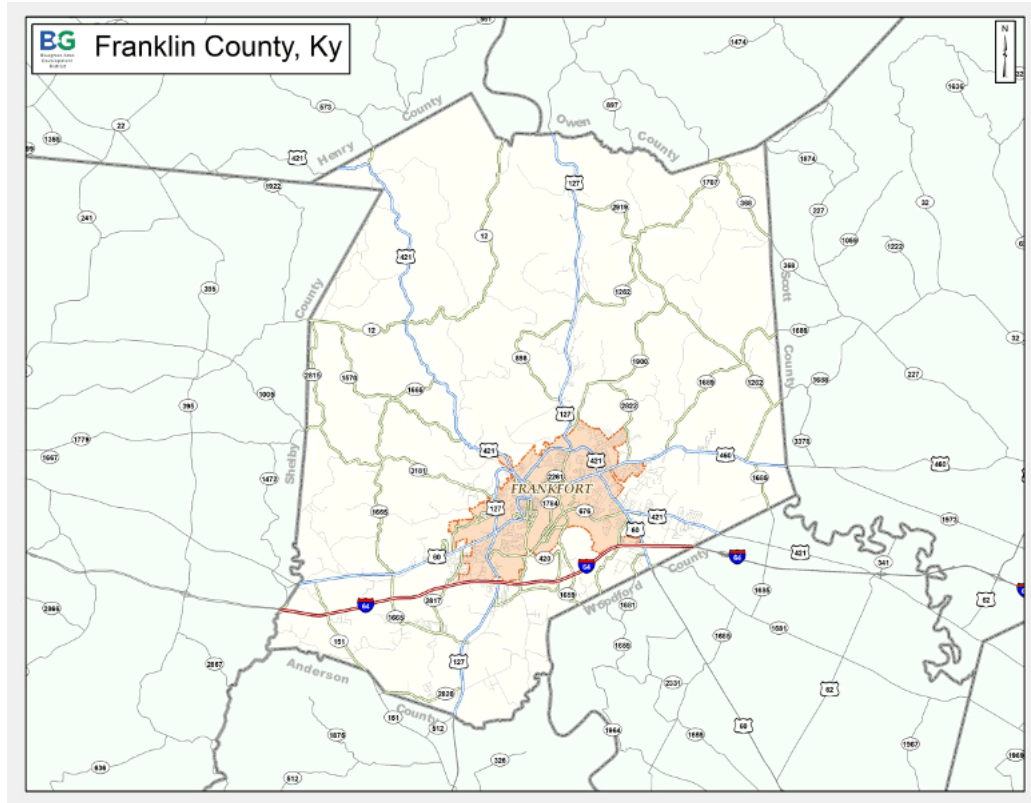
The Frankfort Cemetery and the Salato Wildlife Education Center located east of Frankfort on U.S. Highway 60 at Number One Game Farm Road.

While the planning process for Franklin County and the City of Frankfort did not elicit mitigation actions for wildfire specifically for this site, it is relevant to note these two (2) sites in case future circumstances necessitates or prompts the identification of mitigation actions.

³⁰ The “Generalized Geologic Map for Land-Use Planning: Franklin County, Kentucky” by the Kentucky Geological Survey (KGS) can be accessed here: https://uknowledge.uky.edu/kgs_mc/103/. [Last accessed 3/2/2022]

Chapter 3: MITIGATION STRATEGY

Geography



Development Data – Franklin County

Population Data (Census, 2020)

Subject	Estimate	Percent
Total Population	51,541	100
Male	24,894	48.3
Female	26,647	51.7
Median age (years)	40.9	N/A
Race		
White	43,500	84.4
Black or African American	5,463	10.6
American Indian and Alaska Native	206	0.4
Asian	1,082	2.1
Native Hawaiian and Other Pacific Islander	0	0
Some other race	1,290	2.5

Franklin Co. Population Change: 2014 – 2021 (ACS 2014, Census 2020)

Subject	2014	2021	Change (%)
Total Population	49,509	51,541	4
Male	24,022	24,894	4
Female	25,487	26,647	5
Median age (years)	40.2	40.9	2
Race	-	-	-
White	41,146	43,500	6
Black or African American	5,176	5,463	6
American Indian and Alaska Native	109	206	89
Asian	711	1,082	52
Native Hawaiian and Other Pacific Islander	0	0	-
Some other race	985	1,290	31

Housing Data (Census, 2020)

HOUSING OCCUPANCY	Estimate	Percent
Total housing units	24,000	100
Occupied housing units	21,838	91
Vacant housing units	2,162	9

Jurisdictional Overviews (Census, 2020)

Franklin County	51,541
Frankfort	28,602

Economy and Employment (Census, 2020)

EMPLOYMENT STATUS	Estimate	Percent
In labor force	24,515	61
Civilian labor force	24,390	60.6
Employed	21,682	53.9
Unemployed	2,708	6.7
Armed Forces	2	0
Not in labor force	15,704	39
Median household income (dollars)	46,818	N/A
Mean household income (dollars)	61,638	N/A

Below is a future land-use map from Franklin County and the City of Frankfort's comprehensive plan.

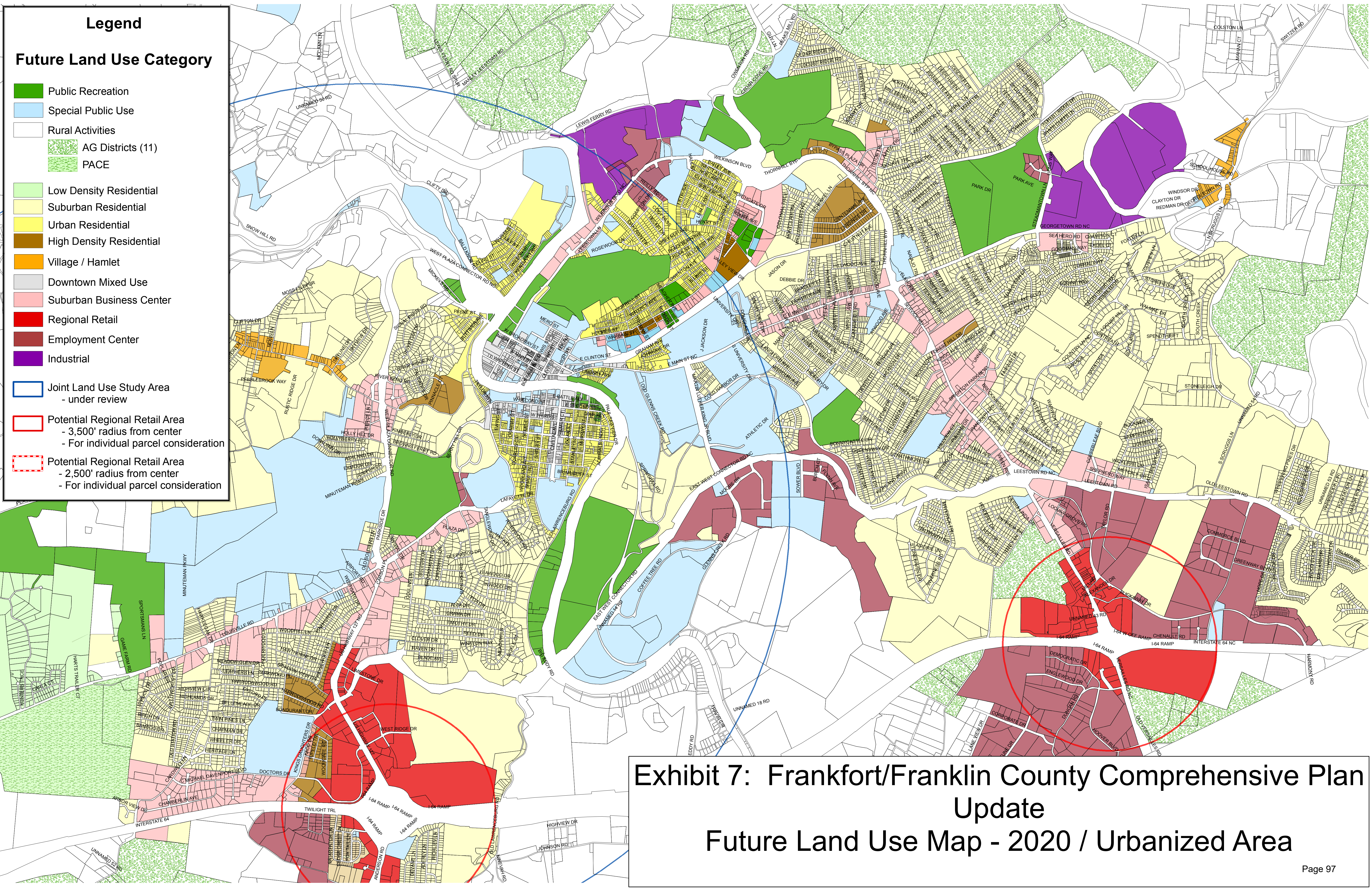


Exhibit 7: Frankfort/Franklin County Comprehensive Plan Update

Future Land Use Map - 2020 / Urbanized Area

Resources and Capabilities

A. State Primary Road System

- I-64 - from the Shelby County Line to the Woodford County Line, a distance of 13.128 miles. (MP 46.303 to MP 59.431)
- US 60 - from the Shelby County Line via Louisville Road, Second Street, Capitol Avenue, East Main Street, and Versailles Road in Frankfort to the Woodford County Line, a distance of 14.038 miles. (MP 0.000 to MP 14.038)
- US 127 - from the Anderson County Line, via Lawrenceburg Road, Wilkinson Blvd, and Owenton Road to the Owen County Line, a distance of 21.400 miles. (MP 0.000 to MP 21.400)
- US 421 - from the Woodford County Line, via Slickway to the junction with US 60. Also, from the junction with US 60/US 460 to the junction with US 127 at the Wilkinson Boulevard/Owenton Road Interchange. Also, from another junction with US 127 (West Frankfort/Plaza Connector) at a point west of the Kentucky River Bridges, via Flag Fork to the Henry County Line, a distance of 17.886 miles. (MP 0.000 to MP 3.072) (MP 3.072 to MP 4.523) (MP 4.523 to MP 17.886)
- KY 151 - from the Anderson County Line to the junction with the I-64 interchange, a distance of 2.141 miles. (MP 0.000 to MP 2.141)
- KY 676 - from the junction with US 127, north of the I-64 - US 127 interchange, via the East-West Connector to the junction with US 60 at the US 421 interchange, a distance of 5.287 miles. (MP 0.000 to MP 5.287)

B. State Secondary Road System

- US 460 - from the junction with US 60 (Versailles Road) and US 421 (Thorn Hill Bypass) in Frankfort, via Forks of Elkhorn and Woodlake to the Scott County Line, a distance of 6.114 miles. (MP 0.000 to MP 6.114)
- KY 151 - from the I-64 interchange to the junction with US 60 near the Shelby County Line, a distance of 1.083 miles. (MP 2.141 to MP 3.224)
- KY 420 - from the junction with US 127, via Old Lawrenceburg Road to the junction with KY 676 (East-West Connector). Also from another junction with KY 676 (East-West Connector), via Old Lawrenceburg Road, Todd Street, and Capitol Avenue in Frankfort to the junction with US 60 (Second Street) in Frankfort. Also, from another junction with US 60 at the north limits of the Kentucky River Bridge, via West Main Street, High Street, and Mero Street to the junction with US 127 at the Wilkinson Boulevard (to include the non-cardinal direction couplet of West Clinton Street: from Wilkinson Boulevard to Ann Street; Ann Street: from West Clinton Street to West Main Street; and West Main Street: from Ann Street to High Street), a distance of 4.732 miles. (MP 0.000 to MP 2.145) (MP 2.145 to MP 4.122)(MP 4.122 to MP 4.732)
- KY 1659 - from the intersection with KY 676 in Frankfort, via Martin Luther King Boulevard, to the junction with US 60 (East Main Street) in Frankfort, a distance of 0.730 mile. (MP 3.356 to MP 4.086)
- KY 1681 - from the junction with US 60 near the Woodford County Line via Old Frankfort Pike to the Woodford County Line, a distance of 0.184 mile. (MP 0.963 to MP 1.147)
- KY 1211 - from the junction with US 60 (Louisville Road) in Frankfort, via Taylor Avenue to the junction with US 127 and US 421, a distance of 0.889 mile. (MP 0.000 to MP 0.889)
- KY 2261 - from the junction with KY 420 (cardinal direction) at Mero Street, via Ann Street and Clinton Street to a junction with KY 420 (cardinal direction) at High Street. Also, from another junction with KY 420 at the High Street/Mero Street intersection, via Holmes Street to the junction with US 127 at the Wilkinson Boulevard Overpass, a distance of 1.832 miles. (MP 0.000 to MP 0.162) (MP 0.162 to MP 1.832)

Capabilities to Administer Mitigation Actions

In terms of capabilities to administer and manage mitigation actions, Franklin County and the City of Frankfort have the distinct advantage of proximity to and integration with the commonwealth proper given that the City of Frankfort (that comprises most of Franklin County) is the seat of commonwealth government. Franklin County and the City of Frankfort houses most commonwealth agencies responsible for implementing FEMA programs and for implementing other state and federal/federal pass-through programs.

Relevant to administering individual mitigation actions, Franklin County houses the county's and the City of Frankfort's emergency manager (i.e., its Emergency Management Director). The Emergency Management Agency is a combined City/County agency and the agency combines homeland security functions, as well: The Frankfort/Franklin County Emergency Management Agency/Office of Homeland Security is adequately staffed and further houses two Deputy Emergency Management Directors that speak to the organization's structure.

The City of Frankfort employs a City Manager.

Franklin County houses a Community Development and Grants Administrator that operates directly under the Franklin County Fiscal Court. A grants administrator that specializes in community development is an obvious capability for implementing mitigation actions as community development frequently is a co-benefit or an expressed purpose for pursuing mitigation activity.

Franklin County and the City of Frankfort are served by a separate department devoted to planning, zoning, and code enforcement (i.e., the Franklin County Department of Planning, Zoning, and Code Enforcement). Staff in this department administer the Franklin County Zoning Ordinance that includes floodplain ordinances. It develops regularly the Comprehensive Plan for the county and for the City of Frankfort.

Franklin County houses the Franklin County Trust for Historic Preservation that is a non-profit 501(c)(3) devoted to advocating for and preserving historic places in Franklin County and the City of Frankfort. Thus, it technically is a capability in potentially being able to provide technical assistance in historic preservation concerns as they pertain to pursuing mitigation actions.

Franklin County and the City of Frankfort are active Community Rating System (CRS) participants and both jurisdictions maintain Class 8 status.

In terms of relevant budgetary and financial capabilities, the City of Frankfort maintains and provides funding for a Kentucky Capital Development Corporation and for Downtown Reinvestment Grants. It has a planning and community development budget. This implies that the City of Frankfort has the political will and the means to maintain and foster its potential mitigation investments.

Franklin County and the City of Frankfort maintain a Stormwater Utility Program and have applied for and received an MS4 (Municipal Separate Storm Sewer System) permit that requires a plan for community water quality, a plan for water education and involvement, a plan to map

and maintain the county's and city's storm system, a plan for erosion from construction, a plan for Green Infrastructure (GI) or Nature-Based Solutions development, and a plan to prevent pollution throughout the county and city. The Stormwater Program includes funding capital projects that address drainage and flooding problems resulting from the stormwater system for both Franklin County and the City of Frankfort. These capital projects are funded through dedicated funds from the county and city Capital Improvements Projects (CIP) budgeting³¹.

Finally, the Bluegrass Area Development District is a capability for Franklin County and the City of Frankfort as it helps these jurisdictions apply for and administer mitigation grants and conducts the regional planning activities for which the county and city itself would be responsible otherwise.

In terms of its ability to expand on and improve the abovementioned existing policies and programs, the resources and staffing available to Franklin County and the City of Frankfort are sufficiently adequate to address changes or additions to the mitigation and/or regulatory environment, to cost-share mitigation grants, and to expand and improve administration.

Critical Facilities and Infrastructure

*See table on following page(s)

³¹ Technically, “[a] Stormwater Utility is a legally defensible Financing Option based on a comprehensive Financing Option Analysis that establishes a dedicated funding source with proceeds deposited into an Enterprise Fund that by law can only be spent on stormwater related projects such as water quality (MS4), drainage, flooding problems, and certain CSO-related projects.”

The information for this paragraph derives from a publicly-available slideshow presentation entitled “Franklin County/City of Frankfort Stormwater Program.” The presentation can be accessed from the City of Frankfort’s website: <https://www.frankfort.ky.gov/DocumentCenter/View/362/Franklin-County---City-of-Frankfort-Storm-Water-Program-Presentation-PDF>

Critical Facilities and Infrastructure

Name	Address	City	Type
Capital Day School	120 Deepwood Road	Frankfort	Schools and Daycares
Good Shepherd School	316 Wapping Street	Frankfort	Schools and Daycares
Frankfort Alternative School	Wilkinson Boulevard	Frankfort	Schools and Daycares
Bridgeport Elementary School	555 Bridgeport Road	Frankfort	Schools and Daycares
Hearn Elementary	200 Laralan Avenue	Frankfort	Schools and Daycares
Peaks Mill Elementary	6950 Peaks Mill Road	Frankfort	Schools and Daycares
New Hope Christian Academy	2842 US Highway 421	Midway	Schools and Daycares
Western Hills High School	100 Doctors Drive	Frankfort	Schools and Daycares
Bondurant Middle School	Bondurant Drive	Frankfort	Schools and Daycares
Collins Lane Elementary School	1 Cougar Lane	Frankfort	Schools and Daycares
Second Street Elementary School	W 2 nd Street	Frankfort	Schools and Daycares
Frankfort High School	Shelby Street	Frankfort	Schools and Daycares
Kentucky State University	400 E Main Street	Frankfort	Schools and Daycares
Franklin County High School	1100 E Main Street	Frankfort	Schools and Daycares
Franklin County Area Vocational Education Center	1106 E Main Street	Frankfort	Schools and Daycares

Name	Address	City	Type
Elkhorn Elementary School	928 E Main Street	Frankfort	Schools and Daycares
Elkhorn Middle School	1060 E Main Street	Frankfort	Schools and Daycares
Frankfort Christian Academy	1349 US Highway 421	Frankfort	Schools and Daycares
Westridge Elementary School	200 Oak Ridge Drive	Frankfort	Schools and Daycares
Frankfort/Franklin Co. 911	315 W 2 nd Street	Frankfort	Public Safety
Frankfort/Franklin Co. EOC	315 W 2 nd Street	Frankfort	Public Safety
Division of Emergency Management	100 Minutement Parkway	Frankfort	Public Safety
Franklin County Fire Department	975 Chenault Road	Frankfort	Public Safety
Frankfort Fire and EMS Station #1	315 W 2 nd Street	Frankfort	Public Safety
Frankfort Fire and EMS Station #2	131 Holmes Street	Frankfort	Public Safety
Frankfort Fire and EMS Station #3	1100 Louisville Road	Frankfort	Public Safety
Frankfort Fire and EMS Station #4	900 E Main Street	Frankfort	Public Safety
Franklin County Fire Station #7	9091 Owenton Road	Frankfort	Public Safety
Franklin County Fire Station #6	955 Flatcreek Road	Frankfort	Public Safety
Franklin County's Sheriff's Office	224 Saint Clair Street	Frankfort	Public Safety
Frankfort Police Department	308 W 2 nd Street	Frankfort	Public Safety
Crime Stoppers	315 W 2 nd Street	Frankfort	Public Safety
Kentucky State Police	1250 Louisville Road	Frankfort	Public Safety
Franklin County Sheriff's Office	315 W Main Street	Frankfort	Public Safety
Franklin County Courthouse	315 W Main Street	Frankfort	Government Facilities

Name	Address	City	Type
Frankfort City Hall	315 W 2 nd Street	Frankfort	Government Facilities
Kentucky State Capitol Building	700 Capital Avenue	Frankfort	Government Facilities
John C. Watts Federal Building	330 W Broadway	Frankfort	Government Facilities
Frankfort Regional Medical Center	299 King's Daughters Drive	Frankfort	Medical Facilities
Bedford Square Nursing Home	1040 US Highway 127 S	Frankfort	Medical Facilities
Frankfort Care and Rehabilitation	117 Old Soldiers Lane	Frankfort	Medical Facilities
Franklin County Senior Citizens Center	202 Medical Heights Drive	Frankfort	Medical Facilities
Franklin County Health Department	851 E West Connector	Frankfort	Medical Facilities
Kentucky Transportation Cabinet	200 Mero Street	Frankfort	Transportation
Capital City Airport	90 Airport Road	Frankfort	Transportation
Imperial Mobile Home Park	-	Frankfort	Housing
Capital Mobile Home Park	-	Frankfort	Housing

Name	Address	City	Type
Siren 1	-	Frankfort	Warning Siren
Siren 2	-	Frankfort	Warning Siren
Siren 3	-	Frankfort	Warning Siren
Siren 4	-	Frankfort	Warning Siren
Siren 5	-	Frankfort	Warning Siren
Siren 6	-	Frankfort	Warning Siren
Siren 7	-	Frankfort	Warning Siren
Siren 8	-	Frankfort	Warning Siren
Siren 9	-	Frankfort	Warning Siren
Siren 10	-	Frankfort	Warning Siren
Siren 11	-	Frankfort	Warning Siren
Siren 12	-	Frankfort	Warning Siren
Siren 13	-	Frankfort	Warning Siren
Siren 14	-	Frankfort	Warning Siren
Siren 15	-	Frankfort	Warning Siren
Siren 16	-	Frankfort	Warning Siren
Siren 17	-	Frankfort	Warning Siren
Siren 18	-	Frankfort	Warning Siren
Siren 19	-	Frankfort	Warning Siren
Siren 20	-	Frankfort	Warning Siren

Goals and Prioritization and Changes to Goals and Prioritization

Below are listed the goals guiding mitigation activity for Franklin County and for the City of Frankfort. The City of Frankfort and Franklin County, unincorporated, share most administrative tasks relevant to implementing mitigation actions. Thus, the goals below reflect both the goals of Franklin County, unincorporated, and the goals of the City of Frankfort.

The goals for both Franklin County, unincorporated, and the City of Frankfort did not change from their articulation in the previous iteration of the Bluegrass Area Development District multi-jurisdictional, multi-hazard mitigation plan:

Earthquakes

- Lessen the number of deaths and injuries in the event Frankfort and/or Franklin County experiences an earthquake.
- Educate the general public about earthquakes.
- Lessen the future fiscal costs upon units of government as well as lessen the amount of property damage in the event Frankfort and/or Franklin County experiences an earthquake.

Flooding

- Reduce the amount of flooding throughout the county through proper identification of flood prone areas.
- Identify the phases/actions to be taken in the event of a flooding incident (in accordance with the Franklin/Frankfort Emergency Operations Plan).

Karst

- Ensure public safety.
- Protect property and infrastructure.

Landslides

- Encourage the proper management of timbered areas throughout the county in order to prevent the improper deforestation of these lands, which leads to topsoil erosion and land sliding.
- Ensure that city/county/state roadwork crews have the necessary personnel and equipment to respond to landslides on roadways.
- Educate the public about the dangers of unstable land and constructing homes and businesses on landslide-prone areas.

Severe Storms and Tornadoes

- To lessen the number of deaths and injuries in a tornado or significant weather event.
- Ensure that emergency responders have the resources at their disposal to properly respond and assist the public in the event of a tornado or other potentially life-threatening storm.
- Continue to lessen the amount of property damage and the impact on critical infrastructure such as roads, electricity, water supply, telecommunications, and sewer service in the event of a tornado or other destructive weather event.

Severe Winter Storms

- Lessen the number of injuries and deaths in the event of a severe winter storm event.
- Educate the general public about the dangers of winter storms.
- Lessen the future fiscal costs upon units of government as well as lessen the amount of property damage in the event Frankfort and/or Franklin County experiences a severe winter storm.

Wildfires

- Protect life and property within the County and City in the event of a wildfire.

Project Prioritization

In 2017, projects were prioritized on the cost of the project, feasibility of the project, and overall vulnerability. The plan also focused on the project's relationship to the community's priorities. Prioritization methodology has not significantly changed in 2022. Projects are prioritized by hazard and then by their assumed cost-benefit logic. Projects will be ranked as having a HIGH, MEDIUM, or LOW priority. Projects that have a high priority are those projects that address hazards from which there is a HIGH vulnerability and are feasible from a cost and capability standpoint. Projects that ranked as MEDIUM address hazards with a HIGH vulnerability but are not currently feasible from a cost and capability standpoint or address hazards with a MODERATE vulnerability but are feasible from a cost and capability standpoint. Projects ranked as LOW are those projects that address hazards with a LOW vulnerability.

Mitigation Actions for Franklin County

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Promote the comprehensive updating of Flood Insurance Rate Maps (FIRMs).	Cedar Run Branch floodplain mapping	Cedar Run Branch and all of Franklin County and the City of Frankfort have their floodplain maps updated or are on the schedule to be updated	No New Projects	Flooding	FEMA; Kentucky Division of Water; Franklin County Planning, Zoning, & Code Enforcement;	FEMA RiskMAP	High
Encourage the improvement of the drainage and retention areas in the County.	Regional basin on US-421; Detention basins at I-64 interchange; US-127 and KY-676; Indian Hills	All Previous Cited Projects Still Pursuing Funding Opportunities	Restore Riverbend – Riverview Park	Flooding	County elected officials, Franklin County Planning and Zoning, Public Works, Road Department, Department of Water	FEMA HMA	High
Seek funding for the remodel and rehabilitation of existing flood stations.	Not Applicable: NEW Action/Project	Not Applicable: NEW Action/Project	Focus on Jones Run, Mero Street, and 2 nd Street Flood Stations	Flooding	County elected officials, FEMA, Frankfort/Franklin County Emergency Management Agency	FEMA HMA	High
Ensure that culverts throughout the county are free of debris or other restrictions that restrict flow.	Hudson Hollow Inlet	Habitually Pursued	Not Applicable: Maintenance	Flooding	FEMA, Division of Water, Franklin County Planning and Zoning, County elected officials	County Budget	High
Establish a vegetative management program within non-vegetative areas along waterways.	Cedar Run Branch, Kentucky Avenue; Big Eddy; Glenss Creek; Kentucky River	All Previous Project Sites Still Pursuing Funding Opportunities	Not Applicable: 2017 Projects Remain in Queue	Flooding	Division of Water, County elected officials, Department of Agriculture, Kentucky Department of Fish and Wildlife Resources, US Army Corps of Engineers	FEMA HMA; EPA 319	High
Implement a localized evacuation	Support, utilize, and update mass	Habitually Pursued	Not Applicable:	Flooding	Frankfort/Franklin County Emergency Management	County Budget; FEMA HMA (if applying for	High

³² Hazard Vulnerability: Earthquakes (Low), Flooding (High), Karst (Medium), Landslides (High), Severe Storms and Tornadoes (High), Severe Winter Storms (Moderate), Wildfires (Moderate)
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Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
planning and management program to ensure that County residents can safely seek higher ground.	notification system, flood inundation mapping project.		2017 Actions Remain in Queue or Maintenance		Agency, County and City Fire Departments, Sheriff's Department, Frankfort Police Department	mass notification system); FEMA RiskMAP	
Seek funding to acquire homes in identified flood-prone areas of the county.	Focus on homes in the following areas: Cedar Run Branch, Kentucky River, Elkhorn Creek, Crab Orchard.	An SRL acquisition project had an application submitted to FMA and was later withdrawn.	Not Applicable: Sites Identified in 2017 as Examples Still Prescient	Flooding	FEMA, County elected officials, Kentucky Emergency Management Agency, Frankfort/Franklin County Emergency Management Agency	FEMA HMA (particularly FMA and HMGP)	Medium
Seek funding to elevate homes in identified flood-prone areas of the county.	Not Applicable: New Action	New Action, or, Rather, Clarification to Distinguish Elevation from Acquisition	Development of a Property Elevation Project	Flooding	FEMA, County elected officials, Kentucky Emergency Management, Frankfort/Franklin County Emergency Management Agency	FEMA HMA (particularly FMA and HMGP)	High
Encourage the placement of, use of, and purchase of flood gages for the County's waterways.	Add additional gages.	Habitually Pursued	Not Applicable: Generally, adding gages is the action.	Flooding	County elected officials, Frankfort/Franklin County Emergency Management Agency, US Geological Survey, National Weather Service	County Budget. Potentially would pursue federal or external opportunities, if identified	High

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Develop an information strategy to educate the public about flood prone areas within the County, informing them of the regulations in place regarding flooding and the importance of not constructing homes and other facilities in the floodplain.	Public service announcements, publications, website, social media	Habitually Pursued	Not Applicable: Maintenance	Flooding	County elected officials, Frankfort/Franklin County Emergency Management Agency	County Budget	High
Pursue flood control projects.	Seek funding for backup pumps; Holmes Street drainage projects; maintenance of current infrastructure	No Progress on Action: The county itself did not seek a flood control project. The City of Frankfort did, though.	Not Applicable: No specific examples of this action had been given for the county at the time of writing	Flooding	FEMA, Division of Water, Frankfort/Franklin County Planning and Zoning, City elected officials	FEMA HMA (particularly BRIC)	Medium
Place alert radios in schools, nursing homes, and hospitals.	Seek funding for weather alert radios	Habitually Pursued. Weather Alert Radios have been purchased, generally	Not Applicable: The County continues to seek purchase of additional radios	Severe Thunderstorms	Frankfort/Franklin County Emergency Management Agency, Frankfort and Franklin County Schools, Local nursing homes	KY Office of Homeland Security; FEMA HMA	High
Implement the comprehensive siren plan for the county and ensure all are in proper working order.	Seek funding for new storm sirens.	Habitually Pursued. Sirens have been purchased and installed, generally	Not Applicable: The County continues to seek purchase and installation of sirens	Severe Thunderstorms	Frankfort/Franklin County Emergency Management Agency, County elected officials	KY Office of Homeland Security; FEMA HMA	High

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Seek a solution to the lack of radio signal throughout the county in order to ensure that emergency response and recovery personnel are able to communicate with each other in the event of a tornado or severe storm.	Update and upgrade radio equipment and maintenance	Habitually Pursued	Not Applicable: Maintenance	Severe Thunderstorms	Frankfort/Franklin County Emergency Management Agency, County elected officials, Franklin County 911	KY E911 Service Board Grant	High
Evaluate the number of shelters currently in place and look at establishing more throughout the county.	Seek funding to create shelters and complete feasibility study of locations	While shelters perennially are erected and identified in response to relevant events, safe rooms have not had a successful application in the past five (5) years	Community Safe Rooms or Residential Safe Rooms	Severe Thunderstorms	Frankfort/Franklin County Emergency Management Agency, County elected officials, Health Department, Red Cross	FEMA HMA (particularly HMGP)	High
Assist special needs populations during winter storm events.	Seek funding for ADA accessible shelters and safe rooms with power supplies and continue to provide support for social service agencies.	While shelters perennially are erected and identified in response to relevant events, safe rooms have not had a successful application in the past five (5) years	Community Safe Rooms or Residential Safe Rooms	Winter Storms	Frankfort/Franklin County Emergency Management Agency, Health Department, City and County Fire Departments	FEMA HMA	Medium (Moderate)

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Maintain fleet to be used for road clearing and maintenance during winter storms to mitigate the number of accidents and injuries on roadways.	Seek funding to acquire vehicles and equipment for snow/ice/debris removal	Habitually Pursued	Not Applicable: Maintenance; Depreciation	Winter Storms	Towing agencies, County elected officials, County Road Department, Department of Transportation	County Budget; U.S. Department of Transportation; Kentucky Transportation Cabinet; Loans; Bond Issuance	Medium (Moderate)
Identify critical infrastructure that would be vulnerable in the event of an earthquake.	Seek support for an integrated map of all utility services	No Progress on Action: Other Actions Took Priority	Not Applicable: The same action remains a desire.	Earthquakes	County elected officials, Utility companies, Frankfort/Franklin County Emergency Management Agency, Red Cross, Salvation Army	FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC)	Low
Inspect safety standards in all schools and other public buildings.		Habitually Pursued	Not Applicable: Maintenance or a Quotidian Activity	Earthquakes	Frankfort/Franklin County elected officials, School Districts, County Building Inspector, County Fire Marshall	County Budget	Low
Educate the public about the dangers of sinkholes and the problems associated with constructing homes and businesses on unstable land and sinkhole-prone areas.	Update GIS mapping data via property appraisal	No Progress on Action: Other Actions Took Priority; Obvious Funding Sources Are Only Newly Available	Develop a Planning-Related Activity more thoroughly analyzing the risk from sinkholes and subsidence	Karst	County Extension Office, County PVA Office, Frankfort/Franklin County Planning and Zoning, Kentucky Geological Survey	FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC)	Medium

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Document all karst areas within the County.		No Progress on Action: Other Actions Took Priority; Obvious Funding Sources Are Only Newly Available	Develop Planning-Related Activity more thoroughly analyzing the risk from sinkholes and subsidence	Karst	Frankfort/Franklin County Planning and Zoning, Kentucky Geological Survey	FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC)	Medium
Ensure that fire departments have the necessary personnel and resources available to them in order to respond to grass and other wildfires throughout the county.	Seek funding to update and upgrade equipment and track updates to the system.	Habitually Pursued	Not Applicable: Remains as Written; Maintenance	Wildfire	City/County Fire Departments, County elected officials, KY Division of Forestry	FEMA AFG	Medium
Ensure that rural parts of the county have adequate water in order to fight grass and other wildfires.	Seek funding for an 8-inch main (Justice Lane) and funding to study infrastructure needs/improvements.	No Progress on Action: Continues to Be Pursued	Not Applicable: Focused Still on Justice Lane and Infrastructure Study	Wildfire	Division of Water, Local Water Utility, Fire Department, Bluegrass ADD	FEMA HMA (both project and planning funding as a Planning-Related Activity)	Medium
Update the identification of county and city hydrant/water source locations through Geographic Information Systems (GIS).	Maintain software, funding for field GPS, aerials and tech support.	Habitually Pursued	Not Applicable: Maintenance	Wildfire	Bluegrass ADD, City/County elected officials, Frankfort/Franklin County Planning and Zoning	County Budget	Medium

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Apply for KY Firewise Community Mitigation Grant, which enables local units of government and their agencies to obtain funds to study the problem of wildfires and carry out projects that mitigate against wildfires.	Apply for funding focused on northern areas of Franklin County	No Progress on Action: Continues to Be Pursued	Not Applicable: The Action Remains as Written	Wildfire	County elected officials, Fire Departments, Bluegrass ADD	Firewise Community Mitigation Grant	Medium
Ensure that county roadwork crews have the necessary personnel and equipment to respond to city/county/state landslides on roadways.	Seek funding to upgrade and/or acquire heavy equipment	Habitually Pursued	Not Applicable: County Perennially Seeks Funding to Upgrade and/or Acquire Heavy Equipment	Landslides	County elected officials, County Road Department, Kentucky Department of Transportation	County Budget; U.S. Department of Transportation; Kentucky Transportation Cabinet; Loans; Bond Issuance	High
Ensure that areas susceptible to landslides/rockslides in the county are properly maintained in order to prevent loss of life and property in the event of a landslide.	Seek funding to hire a consultant to conduct a steep slope inventory. Seek mitigation funding for the following areas: Big Eddy Road, Old Lawrenceburg Road, Taylor Avenue, Kentucky Avenue, Flat Creel, Glenn's Creek, and Devil's Hollow.	No Progress on Action: Funding Source Not Identified	Not Applicable: Rather, the example from 2017 might be disaggregated into two (2) projects with the first one being potentially a FEMA HMA planning project.	Landslides	County elected officials, County Road Department, Kentucky Department of Transportation, Kentucky Geological Survey	FEMA HMA (most likely HMGP for the mitigation project); FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC)	High

Action	Project Examples Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Project Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³²
Promote the proper management of timbered areas throughout the county in order to prevent the improper deforestation of these lands, which leads to topsoil erosion and land sliding.	Seek funding to maintain inventory and fund study of timbered areas.	No Progress on Action: Funding Source Not Identified	Not Applicable: Remains as Written. If conceptualized differently, may be eligible as a FEMA HMA planning project	Landslides	County elected officials, Conservation District, NRCS, Division of Forestry, Department of Transportation, Envision Frankfort/Franklin County, Kentucky Department of Fish and Wildlife Resources, Kentucky Geological Survey	County Budget (potentially FEMA HMA planning grant)	High
Seek funding to repair, replace, or relocate structures affected by landslides.	Efforts should be focused on but not limited to the following areas: Old Lawrenceburg Road, Big Eddy Road, Paul Sawyer Drive, and Glenn's Creek.	No Progress on Action: Continues to Be Pursued (Rather, flooding-related acquisitions and elevation projects were pursued.)	Not Applicable: Remains as Written; Sites Still of Focus	Landslides	County elected officials, Bluegrass ADD, FEMA, Kentucky Housing Corporation, NRCS	FEMA HMA	High
Seek funding for generators.	Sheriff's Office and Fire Station Generators	Completed (under HMGP DR-4218)	Not Applicable: There are no new examples; but, the action remains generally. As Needed or As Identified.	Flooding; Severe Thunderstorms; Winter Storms; Earthquakes	County elected officials, FEMA, Frankfort/Franklin County Emergency Management Agency	County Budget; FEMA HMA	High
Enforce the House Identification System Ordinance to Expedite the Arrival of Emergency Personnel.		Habitually Pursued	Not Applicable	Flooding; Severe Thunderstorms; Wildfire	Bluegrass ADD; Franklin County Office of Emergency Management; Fire Departments; Police Departments; Sheriff's Office and E911; Local Utilities; County Elected Officials	County Budget	High

Mitigation Actions for the City of Frankfort

Action	Projects Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Projects Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³³
Promote the comprehensive updating of Flood Insurance Rate Maps (FIRMs).	Cedar Run Branch floodplain mapping	Cedar Run Branch and all of Franklin County and the City of Frankfort have their floodplain maps updated or are on the schedule to be updated.	Not Applicable: No New Projects	Flooding	FEMA; Kentucky Division of Water; Franklin County Planning, Zoning, & Code Enforcement;	FEMA RiskMAP	High
Pursue a flood control project in the City.	Seek funding for backup pumps; Holmes Street drainage projects; maintenance of current infrastructure ³⁴	Successfully Pursued: See footnote 29. Generally, the action to pursue flood control projects will continue to be pursued for other sites.	Not Applicable: A major multimillion dollar undertaking has an application submitted to FY 2020 BRIC. See footnote 29. The sites listed in 2017 remain.	Flooding	FEMA, Division of Water, Frankfort/Franklin County Planning and Zoning, City elected officials	FEMA HMA (particularly BRIC)	High
Encourage the improvement of the drainage and retention areas in the City of Frankfort.		No Progress on Action: The Flood Control project action took priority.	Not Applicable: The Action Remains as Written	Flooding	City elected officials, City Road Department, Division of Water, Department of Transportation	FEMA HMA	High

³³ Hazard Vulnerability: Earthquakes (Low), Flooding (High), Karst (Medium), Landslides (High), Severe Storms and Tornadoes (High), Severe Winter Storms (Moderate), Wildfires (Moderate)

³⁴ Of particular note is the **Frankfort Mero Flood Pump Station Renewal and Mero Sanitary Pump Station Relocation** project for which an application was submitted under FY 2020 Building Resilient Infrastructure and Communities (BRIC) grant. This flood control project for the City of Frankfort seeks to relocate the existing sanitary Mero Pump Station from outside the City of Frankfort's floodwall to inside the floodwall to reduce the frequency and volume of CSO's. This project will require re-design of connections with the permitted CSO discharge and Flood Pump Station. The Flood Pump Station, approximately 70 years old) will be renewed to reduce the risk of flooding and account for increased runoff within the watershed.

Action	Projects Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Projects Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³³
Identify and update the list of the City's most "at-risk" critical facilities and evaluate the potential mitigation techniques for protecting each facility to the maximum extent feasible.	Specific projects: Sewer Plan, Kentucky Avenue Access, Humane Society	No Progress on Action: Other Actions Took Priority	Develop a Planning-Related Activity that focuses on critical facility networks and systems or that identifies part of a system, both toward enhancing the mitigation strategy	Flooding	City elected officials, Division of Water, Public Works, Sewer Department, Frankfort/Franklin County Planning and Zoning	FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC)	High
Continue the progress of the early warning notification system such as Mass Notification or other telecommunications system, in order to give residents an even earlier warning of approaching dangerous storms.	Seek funding to upgrade software/hardware.	Some city-funded upgrading of software and hardware occurred. Continues to Be Pursued for the purchase of early warning systems, ringdowns, reverse 911, and sirens	Reverse 911; Ringdown Systems; Early Warning/Detection Sirens	Severe Thunderstorms	City elected officials, Frankfort/Franklin County Emergency Management Agency, Kentucky Emergency Management	FEMA HMGP Initiative Only (for Reverse 911, Ringdown, Sirens, etc.)	High
Maintain recovery shelters to mitigate loss of life and injury post hazard.		While maintaining recovery shelters as a force of habit and expected action, the action should be expanded to include safe rooms.	Community Safe Rooms or Residential Safe Rooms	Severe Thunderstorms	City elected officials, Frankfort/Franklin County Emergency Management Agency, Kentucky Emergency Management	FEMA HMA (particularly HMGP)	High
Encourage the burying of residential utility service(s).		No Progress on Action: Other Actions Took Priority.	Not Applicable: Remains as Written	Winter Storms	City elected officials, Local Utilities, Department of Transportation	FEMA HMA	Medium (Moderate)

Action	Projects Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Projects Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³³
Assist special needs populations during winter storm events.	ADA accessible shelters with power supplies and continue to provide support for social service agencies	While shelters perennially are erected and identified in response to relevant events, safe rooms have not had a successful application in the past five (5) years.	Community Safe Rooms and Residential Safe Rooms	Winter Storms	City elected officials, Police Department, Fire Department, Health Department, Frankfort Regional Medical Center, Red Cross	FEMA HMA	Medium (Moderate)
Maintain fleet to be used for road clearing and maintenance during winter storms to limit the number of accidents and injuries on roadways.	Seek funding to acquire vehicles and equipment for snow/ice/debris removal	Habitually Pursued	Not Applicable: Maintenance; Depreciation	Severe Winter Weather	City elected officials, Public Works, Road Department, Department of Transportation	City Budget; Kentucky Transportation Cabinet	Medium (Moderate)
Identify critical infrastructure that would be vulnerable in the event of an earthquake.	Seek support for integrated map of all utility services.	No Progress on Action: Other Actions Took Priority	Not Applicable: The same action remains a desire.	Earthquakes	City elected officials, Frankfort/Franklin County Emergency Management Agency, Local School Districts	FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC)	Low
Continue inspection of safety standards in all schools and other public buildings.		Habitually Pursued	Not Applicable: Maintenance or Quotidian Activity	Earthquakes	Building inspectors, Frankfort School District, Fire Marshal	City Budget	Low
Encourage retrofit safety standards of current structures prone to earthquake damage.		No Progress on Action: Other Actions Took Priority	Expand the Action to Include the Pursuance of Retrofit Projects	Earthquakes	City elected officials, Building inspectors, Fire Marshal	City Budget (FEMA HMA for the Retrofitting)	Low

Action	Projects Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Projects Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³³
Ensure that areas susceptible to landslides/rockslides in the city are properly maintained in order to prevent loss of life.	Seek funding to hire a consultant to conduct a steep slope inventory. Seek mitigation funding for the following areas: Big Eddy Road, Old Lawrenceburg Road, Taylor Avenue, Kentucky Avenue, Flat Creek, Glenn's Creek, and Devil's Hollow	No Progress on Action: Funding Source Not Identified	Not Applicable: Rather, the example from 2017 might be disaggregated into two (2) projects with the first one being potentially a FEMA HMA planning project.	Landslides	City elected officials, City Road Department, Kentucky Department of Transportation, Kentucky Geological Survey	FEMA HMA (most likely HMGP for the mitigation project); FEMA HMA planning grant (i.e., Planning-Related Activity under HMGP or BRIC	High
Promote the proper management of timbered areas throughout the city in order to prevent the improper deforestation of these lands, which leads to topsoil erosion and land sliding.	Seek funding to maintain inventory and fund study of timbered areas.	No Progress on Action: Funding Source Not Identified	Not Applicable: Remains as Written. If conceptualized differently, may be eligible as a FEMA HMA planning grant	Landslides	City elected officials, Conservation District, NRCS, Division of Forestry, Department of Transportation, Envision Frankfort/Franklin County, Kentucky Department of Fish and Wildlife Resources, KGS	City Budget (potentially FEMA HMA planning grant)	High
Seek funding to repair, replace, or relocate structures affected by landslides.	Efforts should be focused on but not limited to the following areas: Old Lawrenceburg Road, Big Eddy Road, Paul Sawyer Drive, and Glenn's Creek.	No Progress on Action: Continues to Be Pursued (Rather, flooding-related acquisitions and elevation projects were pursued.)	Not Applicable: Remains as Written; Sites Still of Focus	Landslides	Bluegrass ADD, City elected officials, FEMA, Kentucky Housing Corporation	FEMA HMA	High

Action	Projects Cited from 2017	Status of 2017 Actions/Projects	Non-Exhaustive Examples of New Projects Meeting Actions	Hazards Addressed	Partners for Implementation	Funding Source	Priority ³³
Ensure that the Frankfort Fire Department has the necessary personnel and resources available to them in order to respond to fires throughout the city.	Seek funding to update and upgrade equipment and track updates to the system.	Habitually Pursued	Not Applicable: Remains as Written	Wildfires	City elected officials, Frankfort Fire Department, FEMA	FEMA AFG FEMA SAFER	Medium (Moderate)
Monitor and update the identification of city hydrant/water sources through Geographic Information Systems (GIS).	Seek funding to maintain software, funding for field GPS, aerials and tech support	Habitually Pursued	Not Applicable: Remains as Written; Maintenance	Wildfires	City elected officials, Bluegrass ADD, Frankfort/Franklin County Planning & Zoning,	City Budget	Medium (Moderate)
Seek funding for generators.	Not Applicable: New Project	A project for the county was completed under HMGP DR-4218.	As Identified	Flooding; Severe Thunderstorms; Winter Storms; Earthquakes	County elected officials, FEMA, Frankfort/Franklin County Emergency Management Agency	County Budget; FEMA HMA	High
Enforce the House Identification System Ordinance to Expedite the Arrival of Emergency Personnel.		Habitually Pursued	Not Applicable: Enforcement	Flooding; Severe Thunderstorms; Wildfire	Bluegrass ADD; Frankfort/Franklin County Office of Emergency Management; Fire Departments; Police Departments; Sheriff's Office and E911; Local Utilities; County Elected Officials	City Budget	High

Hazard Mitigation Plan Integration into Other Planning Mechanisms

Franklin County and the City of Frankfort are responsible for a comprehensive plan that both jurisdictions contribute to maintaining. Bluegrass Area Development District, Franklin County and the City of Frankfort will ensure that the mitigation actions and relevant risk assessment data is integrated into the comprehensive plan, where applicable.

The Bluegrass Area Development District is, by Kentucky Revised Statute and, subsequently, by Kentucky Administrative Regulation, responsible for regional planning and economic development activities for the counties and cities that it serves. In any plan or planning mechanism over which the Bluegrass Area Development District has control (e.g., the Comprehensive Economic Development Strategy, or CEDS), its staff will ensure that the hazard mitigation plan's actions are integrated into such plans and that actions do not conflict (e.g., that transportation plan actions do not conflict with hazard mitigation plan actions).

The Bluegrass Area Development District also ensures centrally that the hazard mitigation plan components are integrated into county or city plans or into regional plans and planning mechanisms by virtue of the ADD's role in external grant funding administration and application development: A quotidian role for Bluegrass ADD staff is to provide technical assistance and aid in application development for externally-funded projects undertaken by the counties and cities it serves. Performing this function means that if there is plan or planning mechanism requirement, expectation, regulation, or consideration required in order to access the external funds, the Bluegrass ADD must coordinate with said requirements, expectations, regulations, and/or considerations. If applicable, Bluegrass ADD staff will have to integrate hazard mitigation plan components into other plans and planning mechanisms in order to coordinate the external funding necessary to achieve a mitigation goal for the community it is serving.

That this document is able to stand alone (i.e., independent from the Bluegrass Area Development District multi-jurisdictional, multi-hazard mitigation plan) partially ensures that this hazard mitigation plan can be integrated into Franklin County and the City of Frankfort's Community Rating System (CRS) participation and toward earning it points for eligible planning and planning mechanism activities, especially under Activity 510.

Chapter 4: PLAN MAINTENANCE and ENSURING PUBLIC PARTICIPATION IN PLAN MAINTENANCE

For the 2017 multi-jurisdictional, multi-hazard mitigation plan, the Bluegrass ADD evaluated its plan maintenance procedures from the then-previous plan (i.e., 2011) and proposed a then-updated method for plan maintenance:

- Once per year, the Bluegrass ADD will send out e-mails to each Emergency Manager for the sixteen (16) counties over which it serves requesting a review of the goals and objectives for each jurisdiction and requesting an evaluation regarding whether goals and objectives were met through mitigation actions and projects pursued by respective jurisdictions and whether goals, objective, and action still reflect the mitigation needs of those jurisdictions.
- Once every two (2) years, the Homeland Security Council will meet with Bluegrass ADD staff and with the Emergency Management Agency Directors for the counties for which Bluegrass ADD serves to discuss the hazard mitigation plan and to prepare for the next update cycle.

Generally, the Bluegrass Area Development District will continue this plan maintenance methodology and, thusly, has rearticulated it for the 2022 hazard mitigation plan update.

In order to ensure public participation in the plan maintenance process, the Bluegrass Area Development District adds the following task to its plan maintenance methodology:

- Any evaluation/maintenance request submitted to Emergency Managers and/or to the Homeland Security Council also will be made available online, posted to the ADD's public website. The evaluation/maintenance request will be advertised on all of Bluegrass ADD's and the counties' and cities' social media sites.

The Bluegrass ADD would like to add the following expectation or clarification for plan maintenance, however, as it was not articulated directly in 2017: In its quotidian activities, Bluegrass ADD staff provides technical assistance and aids in the development of applications for external funding for the counties and cities it serves. Oftentimes, Bluegrass ADD staff manages the external grants of the counties and cities it serves after an external grant has been awarded. These activities, de facto, require maintenance of the hazard mitigation plan: If a jurisdictions wants to pursue X mitigation action using FEMA Hazard Mitigation Assistance (HMA) and seeks the ADD's assistance in its pursuit, that jurisdiction and the Area Development District must coordinate with the hazard mitigation plan first. The hazard mitigation plan receives ad hoc maintenance.

Chapter 5: PLAN APPROVAL and PLAN ADOPTION