

Tab 3 – Situations & Assumptions

June 2022

BRDHD has many legal and moral responsibilities as a part of our routine duties. Among these include the responsibility to assist in possible scenarios of emergencies that could range from an extremely limited geographically isolated situation to a county or district wide problem. In this section, possible hazard situations will be given, as well as assumptions that are made concerning these hazards.

Hazard Vulnerability Assessment (HVA)

BRDHD has two approaches to identify vulnerabilities in our region.

The first (and most thorough) documentation is provided to the region from the Barren River Area Development District (BRADD). The BRADD Mitigation Plan is *“the result of a local planning process designed to guide the counties and cities of the Barren River region in natural hazard mitigation.”*

The BRADD Mitigation Plan (2022) is the result of individual county meetings and regional meetings. The information obtained at the county meetings is “rolled up” into the regional plan. By conducting meetings and input at the county level, the BRADD office often obtains buy-in from local elected officials and emergency responders.

According to the BRADD Mitigation Plan, the following chart indicates the level or risk for hazards in our area and preparations BRDHD has in place to respond to each event.

Risk	Event	BRDHD Preparations, Plans, and Resources
HIGH RISK HAZARDS	Flooding Damaging Winds Tornado	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3, HEART Natural Death Surge Plan, HEART Death Surge Trailer, HEART Alternate Care Site Trailers
		State – KY Department for Public Health’s (DPH) EOP and KY Emergency Management EOP, National Guard, DMORT, FEMA, DPH Death Surge Trailer
MODERATE RISK HAZARDS	Earthquake Hail Sinkhole Flooding Snowfall	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3, HEART Natural Death Surge Plan,

		HEART Death Surge Trailer, HEART Alternate Care Site Trailer
		State – KY Department for Public Health’s EOP and KY Emergency Management EOP, National Guard, DMORT, FEMA
LOW RISK HAZARDS	Cold Wave Dam Failure Drought Heat Wave Landslides Lighting	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3
		State – KY Department for Public Health’s EOP and KY Emergency Management EOP, National Guard, DMORT, FEMA

The second approach to identifying vulnerabilities within our region is through the Healthcare Emergency Area 4 Resource Team (HEART). **Annually, this group updates an HVA that focuses on health and may impact our region.** The document can be located in the HEART Plan.

According to the HEART Hazard Vulnerability Assessment, the following chart highlights the top three events in each category based on risk and BRDHD preparations to respond to each event.

Category	Top Events Based on Risk	BRDHD Preparations, Plans and Resources
Natural Hazards	Tornado, Severe Thunderstorm, Drought	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3, HEART Natural Death Surge Plan, HEART Natural Death Surge Trailer, HEART Alternate Care Site Trailers, shelter support trailers
		State – KY Department for Public Health’s (DPH) EOP and KY Emergency Management EOP, National Guard, DMORT, FEMA, DPH Death Surge Trailer
Technological Hazard	Electrical Failure, Water Failure, Supply Shortage / Sewer Failure / Gas Failure	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3, HEART Natural Death Surge Plan, HEART Death Surge Trailer, HEART Alternate Care Site Trailers, MoUs between all hospitals, hospital MOUs with suppliers

		State – KY Department for Public Health’s (DPH) EOP and KY Emergency Management EOP, National Guard, FEMA, hospital MOUs between hospitals and suppliers
Human Hazards	Bomb Threat / Hostage Situation, Civil Disturbance, Mass Casualty Incident	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan, Law Enforcement Plans
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3, HEART Death Surge Trailer, HEART Alternate Care Site Trailers
		State – KY Department for Public Health’s (DPH) EOP and KY Emergency Management EOP, National Guard, DMORT, FEMA, FBI
Hazardous Materials	Chemical Exposure, Small Casualty, Haz-Mat Incident Mass Casualty Incident	BRDHD All Hazard Plan
		Local – County Emergency Operation Plans, Emergency Support Function Plans, Lifeskills (mental health) Plan, fire departments plans
		Regional – HEART Regional Plan and BRADD Mitigation Plan, American Red Cross Plan, KY Emergency Management Area 3, HEART Natural Death Surge Plan, HEART Alternate Care Site Trailers, Regional Decon and Rapid Response Teams (Haz-Mat)
		State – KY Department for Public Health’s (DPH) EOP and KY Emergency Management EOP, National Guard, FEMA

Planning Utilizing the Hazard Vulnerability Assessments (HVA)

The BRDHD utilizes both HVA data and After Action Reports from exercises and real events to identify and prepare for vulnerabilities in our region.

The HEART group utilizes the HVA to prioritize planning and equipment purchases to “buy down the risk” of disasters that may impact our region. Because of the HVA, planning and resources have increased. Examples include:

- Alternate Care Site planning and equipment – four ACS trailers with equipment are housed in four of the ten counties in the region.
- Hospitals and Long Term Care facilities – equipment and resources have been purchased to allow health care agencies to be self sufficient during an emergency.
- Generators – responding without electricity to a variety of disasters would be detrimental. Hospitals, long term care facilities, and Emergency Managers have been provided generators to assist with response.

Situations

Kentucky is exposed to many hazards, all of which have the potential to disrupt the community, cause damage, and cause mass casualties.

HIGH RISK HAZARDS	FLOODING DAMAGING WINDS TORNADO
MODERATE RISK HAZARDS	EARTHQUAKE HAIL SINKHOLE FLOODING & COLLAPSE SNOWFALL
LOW RISK HAZARDS	COLD WAVE DAM FAILURE DROUGHT HEAT WAVE LANDSLIDES LIGHTNING

Public Health Consequences for Emergency Situations – Surge Capacity Possible

Public Health Consequence	Flash Flood	Flood	Earthquake	Landslide	Drought	Wildfire
Dealing with Deaths	Many	Few	Many	Many	Few	Few to moderate
Injury Prevention & control	Few to moderate	Few	Overwhelming	Moderate to Many	Unlikely	Few to moderate
Loss of clean water supply	Focal to wide-spread	Focal to wide-spread	Wide-spread	Focal	Wide-spread	Focal
Loss of shelter	Focal to wide-spread	Focal to wide-spread	Wide-spread	Focal	Likely with displaced populations	Focal to wide-spread
Loss of personal and household goods	Focal to wide-spread	Focal to wide-spread	Focal to wide-spread	Wide-spread	Likely with displaced populations	Focal to wide-spread
Major population movements	Possible	Common	Rare	Rare	Likely	Rare
Loss of sanitation	Focal to wide-spread	Focal to wide-spread	Wide-spread	Focal	Likely with displaced persons	Likely with displaced populations
Loss of routine hygiene	Focal to wide-spread	Focal to wide-spread	Focal to wide-spread	Focal	Likely with displaced persons	Likely with displaced persons
Disruption of solid waste management	Focal to wide-spread	Focal to wide-spread	Focal to wide-spread	Focal	Likely with displaced persons	Likely with displaced persons
Public concern for safety	High	Moderate to high	High	High	Moderate to high	High
Increased pest and vectors	Focal to wide-spread	Wide-spread	Wide-spread	Rare	Rare	Rare
Loss and/or damage of healthcare system	Focal to wide-spread	Focal to wide-spread	Focal to wide-spread	Focal	Rare	Focal to wide-spread
Worsening of existing chronic illness	Focal to wide-spread	Focal to wide-spread	Focal to wide-spread	Focal	Wide-spread	Focal to wide-spread
Loss of electricity	Focal to wide-spread	Focal to wide-spread	Focal to wide-spread	Focal	Unlikely	Unlikely
Toxic/hazardous exposure	Possible	Possible	Possible	Possible	Possible	Possible
Loss of food supply	Common	Common	Common	Rare	Common	Possible

Public Health Consequence	Civil Unrest & Warfare	Transportation Crash	Explosion & Bombing	Hazardous Material Release	Structural Collapse	Mass Gatherings
Deaths	Moderate to many	Moderate to many	Moderate to many	Few to moderate	Few to moderate	Few to many
Severe injury	Moderate to many	Moderate to many	Moderate to many	Focal to wide-spread	Moderate to many	Usually few, but many possible
Loss of clean water	Focal to wide-spread	Rare	Rare	Focal to wide-spread	Focal	Focal
Loss of shelter	Focal to wide-spread	Focal	Focal	Wide-spread	Focal	Focal
Loss of personal & household goods	Focal to wide-spread	Focal	Focal	Focal to wide-spread	Focal	Not applicable
Major population movements	Common	Unlikely	Unlikely	Focal to wide-spread	Rare	Possible
Loss of sanitation	Focal to wide-spread	Unlikely	Unlikely	Focal to wide-spread	Focal	Focal
Loss of routine hygiene	Focal to wide-spread	Unlikely	Unlikely	Unlikely	Unlikely	Focal
Disruption of solid waste management	Very high	High	High	Very High	High	Low to moderate
Public concern for safety	Rare	Unlikely	Unlikely	Unlikely	Unlikely	Rare
Increased pest & vectors	Focal to wide-spread	Rare	Rare	Rare	Unlikely	Unlikely
Loss and/or damage of healthcare system	Wide-spread	Focal	Focal	Focal to wide-spread	Unlikely	Focal
Worsening of existing chronic illness	Focal to wide-spread	Unlikely	Unlikely	Unlikely	Focal	Unlikely
Loss of electricity	Possible	Possible	Possible	Likely	Possible	Unlikely
Toxic Exposures	Focal to wide-spread	Unlikely	Unlikely	Focal to wide-spread	Unlikely	Unlikely, possibly focal
Loss of communications	Many	Unlikely	Few	Unlikely	Few	Unlikely

Floods/ Flash Floods

Flash flooding events in the Barren River Region usually occur within minutes or hours of heavy amounts of rainfall. Most flash flooding is caused by slow-moving thunderstorms in a local area. Flash flooding occurs often along hillside streams and is also common in urbanized areas where much of the ground is covered by impervious surfaces. Floodplains and hydrograph maps of the Barren River Region is located in the BRADD Hazard Mitigation Plan (2016), “Floods” risk assessment section in the “Hazard Profiles” chapter.

The threat of flooding varies significantly within the Barren River Area. Hilly topography in the northern and eastern portions of the region can contribute to rapid runoff of precipitation after heavy rainfall resulting in the threat of flash flooding. Other portions of the Barren River Area where karst landscape is present have few surface streams, but flooding is also possible on the sinkhole plain.

Possible Public Health Response to Flooding

Public Health response to flooding may include, but is not limited to:

- Administering Tetanus-Diphtheria vaccine
- Public education that may include:
 - Proper hand washing
 - Boil water advisory
 - Emergency food preparation/preservation
 - Salvaging of food contaminated with flood water
 - How to disinfect well water
- Environmental inspections of food establishments, schools, grocery stores, etc.
- Assist with shelters, including:
 - Providing public health staff to assist with registration at the clinic
 - Environmental inspections of shelters
 - Communicable disease follow up
- Checking on nuisance complaints

Tornadoes

Although tornadoes can occur anywhere and at any time of the year, the peak season stretches for six months from March through August in the South, Southwest and Midwest U.S. Meteorologists classify tornadoes by their wind speeds. The average speed of a tornado is 30 mph but may vary from stationary to 70 mph and have rotating winds in excess of 250 mph. Tornado warnings should be taken very seriously.

Tornadoes are a well-publicized threat in the Barren River Area. Still, the probability of any place within the 4,000 square-mile regions being struck by a tornado in a given year is small. During the period 1950 through 2000, a total of 59 tornadoes were documented. That is, the Barren River Area averages 1.2 tornadoes per year. The greatest number of tornadoes in a single year was ten in 1997. Meanwhile 25 of the 51 years of record had no tornado reports.

Fortunately, the majority of tornadoes to strike the Barren River Area are relatively weak. The strength of a tornado is categorized according to the Fujita scale. Tornadoes in the F0 and F1 categories represent more than 60 percent of all documented tornadoes in the region, yet they have not resulted in any fatalities (Figure 61). These tornadoes typically stay on the ground for only a short distance, often less than one-mile, and cause minimal damage. In contrast, F3 tornadoes represent just over ten percent of the total, but they have accounted for the majority of injuries and fatalities. These tornadoes have the potential of causing severe damage to even well-constructed houses, and they sometimes leave a path of destruction several miles long.

Possible Public Health Response to a Tornado

Public Health response to a tornado may include, but is not limited to:

- Public education that may include:
 - Proper hand washing
 - Boil water advisory
 - Emergency food preparation/preservation
 - Salvaging of food contaminated with flood water
 - How to disinfect well water
- Environmental inspections of food establishments, schools, grocery stores, etc.
- Assist with shelters, including:
 - Providing public health staff to assist with registration at the clinic
 - Environmental inspections of shelters
 - Communicable disease follow up
- Checking on nuisance complaints

Ice Storms / Snowfall

Ice storms are random events that occur infrequently in the Barren River Area. Thirty-three ice storms were documented over the period from 1949 – 1999.

The impact of ice storms can be very severe when subzero temperatures are present, allowing the ice to stay around. When temperatures rise after the ice storm, complications become less severe. Disruption of services such as power and water can result as well as complications with travel and emergency response.

Snowfall totals vary significantly from year to year in the Barren River Area. The average annual snowfall based on stations from across the region is almost 13 inches, with little variation from place to place. Based on the record for Bowling Green, only about 15 percent of winters have brought more than 20 inches of snow.

Snowstorms are recognized more for the disruptions they create than for the damage they cause. They can bring local and regional economies to a standstill by cutting off surface and air transportation, and by downing communication and power lines. Emergency response teams may be slowed in responding or unable to respond to calls for service from stranded motorists and rural residents isolated in their homes. Adverse conditions can be prolonged when blowing and drifting snow along with falling temperatures accompany storms, making it difficult to clear and keep roads open.

Possible Public Health Response to a Winter Storm

Public Health response to a winter storm may include, but is not limited to:

- Public education that may include:
 - Proper use of alternate heat, reduce CO poisoning
 - Proper hand washing
 - Boil water advisory
 - Emergency food preparation/preservation
 - Salvaging of food contaminated with flood water
 - How to disinfect well water
- Environmental inspections of food establishments, schools, grocery stores, etc.
- Assist with shelters, including:
 - Providing public health staff to assist with registration at the clinic
 - Environmental inspections of shelters
 - Communicable disease follow up
- Assist with resource procurement

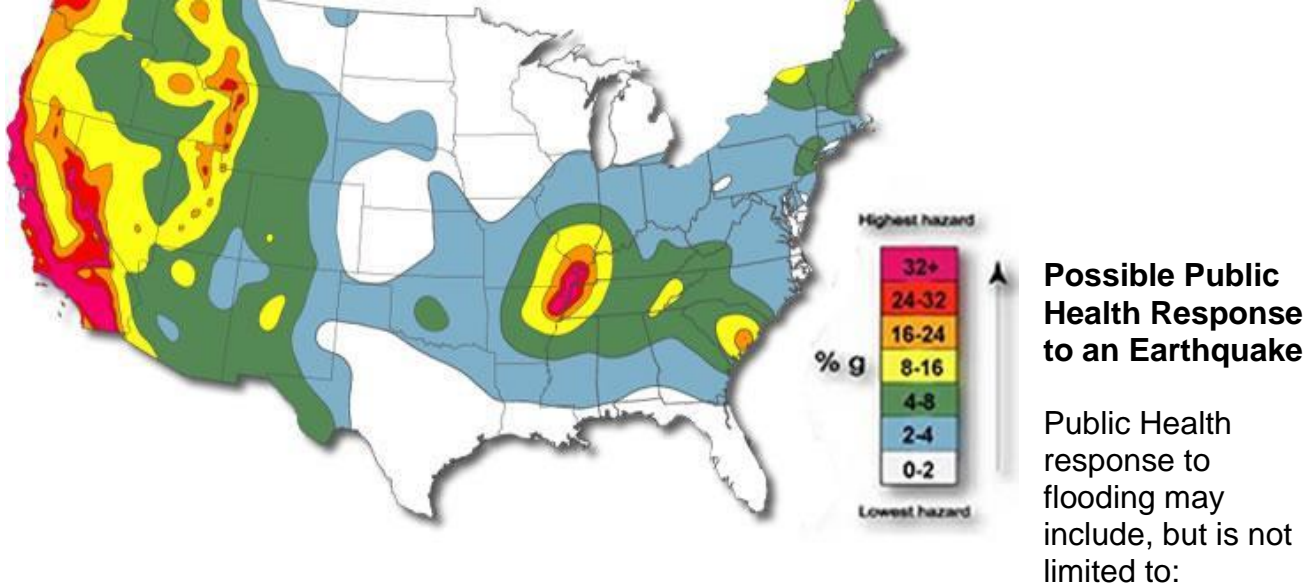
Earthquakes

The state of Kentucky is located in the New Madrid Seismic Zone. This area has experienced three major quakes in years past. The actual motion of the ground in an earthquake is seldom the direct cause of injuries and deaths. Most casualties result from falling objects, debris, and structures that crumble when shaken by seismic waves. The greatest hazard potential in Kentucky is in cities along the river.

An earthquake occurs without warning. We can expect transportation, communication, electricity, natural gas, sewer, and water systems to be disrupted by a major quake. Bridges and dams will be weakened and/or destroyed. Secondary damages as a result of fires, explosions, floods, and ruptures of petroleum and natural gas pipelines may occur. Knowledge of shut off valves and switches for gas is essential.

Fires are a major concern after a quake. Eighty percent of earthquake damages are a result from secondary fires.

Earthquake Hazard Areas



- Public education that may include:
 - Proper hand washing
 - Boil water advisory
 - Emergency food preparation/preservation
 - Salvaging of food contaminated with flood water
- Environmental inspections of food establishments, schools, grocery stores, etc.
- Assist with shelters, including:
 - Providing public health staff to assist with registration at the clinic
 - Environmental inspections of shelters
 - Communicable disease follow up
- Checking on nuisance complaints
- Assist with resource procurement

Assumptions

It is likely that outside assistance will be available in most major disaster situations, and plans are being developed to facilitate coordination of this assistance. It is necessary for the Barren River District Health Department to plan for and to be prepared to carry out disaster response and short-term recovery operations on an independent basis. However, for planning purposes, the worst-case scenario for a disaster is projected. If the situation does not fully develop, the response can be adjusted.

Staff can never assure that every disaster impact is planned for. However, the following are considerations of which all staff should be aware of and concerned about:

- Loss of water, sewage, and electric services
- Numerous persons that are unable to mentally cope with the disaster
- Loss of life
- Loss of food resources
- Loss of communication
- Loss of transportation
- Loss of employment
- Loss of food resources
- Loss of homes and shelters

- Civil disruption and emergency control by military authority