



PERRY COUNTY MULTI-HAZARD MITIGATION PLAN



FEMA



Meeting 1
June 29, 2021
10:00 AM



Welcome and Introductions

Chuck Genesio, *EMA Coordinator* – Perry County EMA

Cary Minnis, *Executive Director* – Greater Egypt



Agenda

1. Welcome and Introductions

Chuck Genesio, EMA Coordinator – Perry County EMA

2. Multi-Hazard Mitigation Planning Process

Tyler Carpenter, Environmental Planning Director, Greater Egypt

3. Responsibilities of Planning Partners

4. Perry County Historical Hazards

Kelsey Bowe, Environmental Planner, Greater Egypt

5. Critical Facilities Data Overview

6. Hazard Ranking Exercise

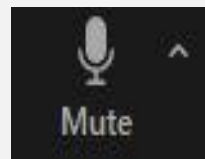
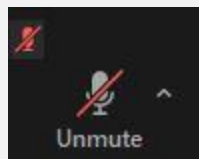
Ciara Nixon, Environmental Planner, Greater Egypt

7. Adjourn

Zoom Meeting Notes

1. Meeting Recording

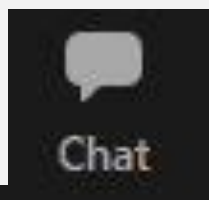
2. Mute/Unmute



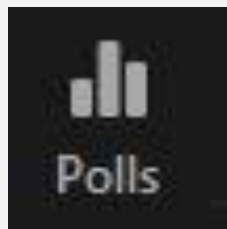
3. Video On/Off



4. Chat Box



5. Polls



6. Breakout Rooms





Multi-hazard Mitigation Planning Process

Tyler Carpenter, Environmental Planning Director - Greater Egypt

- Hazard Mitigation and Assistance
- Multi-hazard Mitigation Planning Process
 - Planning Team
 - Risk Assessment
 - Identify Hazards
 - Vulnerability Assessment
 - Hazard Ranking Exercise
 - Develop Mitigation Strategies
 - Match Requirements
- Adoption of Plan



Hazard Mitigation and Assistance

Disaster Mitigation Act of 2000

- Amended from the Robert T. "Stafford Act"
- Focus on pre-disaster hazard mitigation
- FEMA-approved Hazard Mitigation Plan required
- Five year updates to the plan



Hazard Mitigation and Assistance

Assistance and Funding Opportunities:

HMGP – Hazard Mitigation Grant Program

- Hazard mitigation projects following Presidential disaster declaration

FMA – Flood Mitigation Assistance

- Planning and projects to reduce or eliminate risk of flood to buildings

PDM – Pre-Disaster Mitigation Program

- Hazard mitigation planning and projects on an annual basis

BRIC – Building Resilient Infrastructure & Communities

- Support for states, local communities and tribes as they undertake mitigation projects

Hazard Mitigation and Assistance

HMGP – Hazard Mitigation Grant Program

Reed Station MHP Acquisition

- Jackson County, Illinois
- \$2,918,840 Awarded



Hazard Mitigation and Assistance

HMGP – Hazard Mitigation Grant Program

West Frankfort Wastewater Treatment Plant Relocation

- City of West Frankfort
- \$8,554,250 Awarded

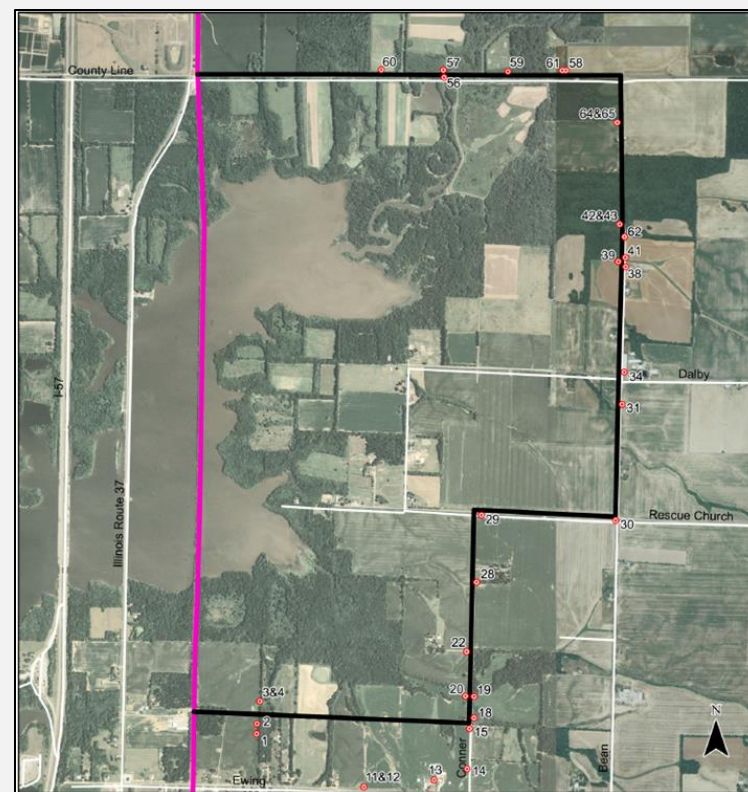


Hazard Mitigation and Assistance

HMGP – Hazard Mitigation Grant Program

Rend Lake Water Main Bypass

- Rend Lake Conservancy District
- \$2,362,065 Awarded





Multi-hazard Mitigation Planning Process

Planning Team

- Stakeholders needed to represent jurisdictions in the county
- Attend two meetings
- Planning Team should include:
 - Emergency Management
 - Land Use/ Economic Development
 - Housing
 - Health and Social Services
 - Infrastructure
 - Natural Resources



Multi-hazard Mitigation Planning Process

Risk Assessment-Identify Hazards

- Identify hazards that threaten county
- Participate in hazard ranking exercise
 - Group determines hazards to be included in plan
 - Participating jurisdictions break out into groups to rank hazards



Multi-hazard Mitigation Planning Process

Risk Assessment-Vulnerability Assessment

- Critical Facilities
- Essential Facilities
 - Emergency Operations
 - Fire Stations
 - Police Stations
 - Schools
 - Care Facilities



Multi-hazard Mitigation Planning Process

Risk Assessment-Risk Analysis

- Results of Hazard Ranking exercise will determine hazards to be modeled
- HAZUS- GIS-based software that identifies and quantifies risk of natural hazards such as:
 - Physical damage
 - Economic Loss
 - Social Impacts



Multi-hazard Mitigation Planning Process

Develop Mitigation Strategies

- Mitigation strategies for identified hazards
- Two strategies for every identified hazard per jurisdiction

Multi-hazard Mitigation Planning Process

Match Requirements

- 75% Federal Dollars for Planning
- 25% Local Match Needed
- Match is Met by Your Participation
 - Meeting Attendance
 - Outside Work on Plan
 - Travel
 - Other Costs
- MHMP Match Survey

MHMP-Salary and Benefit Request

As you are aware, Greater Egypt has contracted with Perry County to assist with the completion of the 5-year update to the Multi-Hazard Mitigation Plan. As a federally-funded project, 25% of the cost of the update must be met by Perry County and other local agencies that participate in the plan update. The match is met through in-kind support or "sweat equity" by the representatives of the participating agencies who attend meetings and take part in the update process. IEMA and FEMA require the actual salary and benefit rates to be used to calculate the cost.

We respectfully request that you provide the names and compensation information for the employees and representatives of your agency who have attended meetings so far, or who have not attended meetings but will eventually be involved in the update process. Please provide this information in the Salary and Benefit Request. This information will remain in strict confidence and will only be utilized to complete the required reports for the IEMA grant manager in Springfield.

For questions regarding this request, feel free to contact Greater Egypt at 618-997-9351.

** Required*

Email *

Your email

First Name *

Your answer

Last Name *

Your answer



Adoption of Plan

- Participating Jurisdictions must adopt plan
- Approval-Pending-Adoption status (FEMA)
- County Adoption

[illegible]



Responsibilities of Planning Partners

- Represent an authorized jurisdiction in the county
- Attend two meetings during planning process
- Complete Hazard Ranking exercise for your jurisdiction
- Propose two mitigation strategies for each hazard
- Assist with meeting match requirements through participation



PERRY COUNTY MULTI-HAZARD MITIGATION PLAN



Historical, current, and potential
hazards

List of critical facilities to be reviewed
and updated

FEMA definitions

- Hazard Extent: Strength or magnitude of hazard. Can be measured with scientific scales (Tornado EF Scale, Palmer drought severity index, etc.), measurements of the hazard (flood height, snow depth, etc.), or other factors such as duration and speed of onset.
- Hazard Impacts: Consequences/effects of the hazard on a community and its assets. Examples include number of injuries/deaths, dollar amount of property/crop damage, number of days without power, etc.

Hazards Overview

This list is not a ranking of hazard risk

1. Tornados & derechos
2. Earthquakes
3. Ground Failure (sinkholes)
4. Floods & dam failure
5. Severe weather
 - Thunderstorms/hail
 - Ice/snow storms
 - Drought & excessive heat

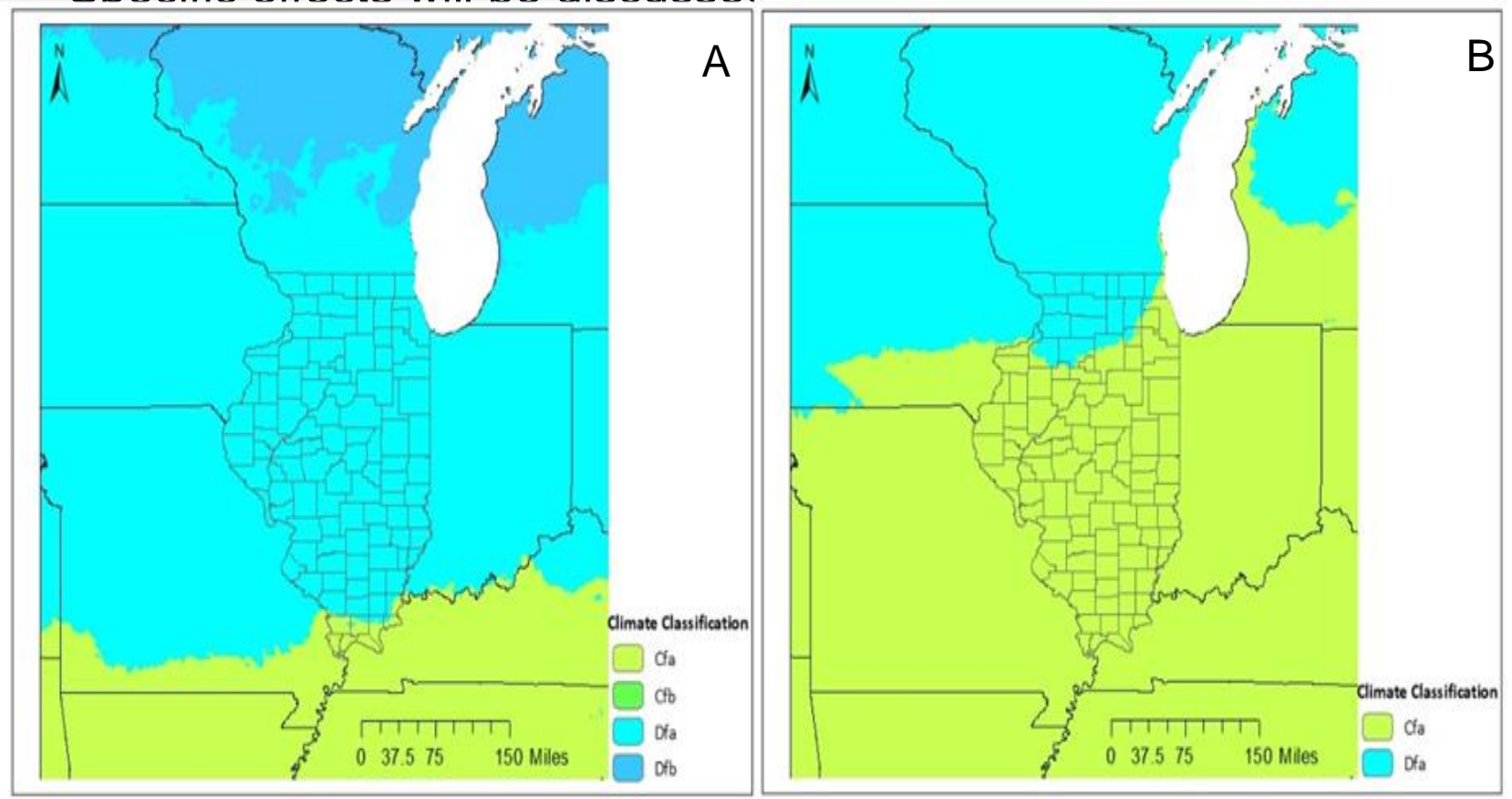
6. Hazardous materials release

7. Pests/ invasive

Historical records will be presented when available, in some cases data is lacking from federal and state sources, local knowledge from planning partners is welcome to improve detail of plans

Emerging hazard – climate change

- Global average temperature has already risen by 1.8 degrees F since 1901
- Specific effects will be discussed with each hazard when relevant



1. TORNADOS

- Violently rotating column of air, attached to base of cloud and extending to ground
- Wind gust speeds usually estimated by damage indicators, may vary from 65 to 200+ mph
- Long lived wind storm with damage occurring along a straight path and continuing in one direction
- Wind gusts must exceed 57 mph to be considered a derecho

Derechos

Enhanced Fujita Number	3-Second Gust Speed (mph)	Selected Degrees of Damage Descriptions
0 Gale	65-85	Loss of <20% roofing material, loss of siding. Loss of rooftop HVAC.
1 Moderate	86-110	Broken glass, loss of >20% roofing material. Manufactured homes overturn but remain intact. Collapse of exterior walls of many types of building. Broken wood electrical poles. Trees uprooted or snapped.
2 Significant	111-135	Houses shift off foundations, collapse of roofs. Manufactured homes destroyed. Collapse of exterior walls of many types of building. Complete destruction of some isolated buildings. Bent or broken steel and concrete electrical poles. Trees snapped and debarked.
3 Severe	136-165	Top floor exterior and interior walls may collapse. Collapse of rigid frames in metal buildings. Damage to wall cladding and roof slabs of institutional buildings (hospitals, courthouses).
4 Devastating	166-200	Collapse of most walls, total destruction of residential houses. Destruction of large buildings such as shopping malls. Significant damage to institutional buildings.
5 Incredible	Over 200	Total destruction of residential houses, destruction of large buildings such as shopping malls. Significant damage to

DI Number	Damage Indicator
1	Small Barns or Farm Outbuildings (SBO)
2	One- or Two-Family Residences (FR12)
3	Manufactured Home – Single Wide (MHSW)
4	Manufactured Home – Double Wide (MHDW)
5	Apartments, Condos, Townhouses [3 stories or less]
6	Motel (M)
7	Masonry Apartment or Motel Building (MAM)
8	Small Retail Building [Fast Food Restaurants] (SRB)
9	Small Professional Building [Doctor's Office, Branch Office]
10	Strip Mall (SM)
11	Large Shopping Mall (LSM)
12	Large, Isolated Retail Building [K-Mart, Wal-Mart]
13	Automobile Showroom (ASR)
14	Automobile Service Building (ASB)
15	Elementary School [Single Story; Interior or Exterior]
16	Junior or Senior High School (JHSH)
17	Low-Rise Building [1-4 Stories] (LRB)
18	Mid-Rise Building [5-20 Stories] (MRB)
19	High-Rise Building [More than 20 Stories] (HRB)
20	Institutional Building [Hospital, Government or University] (IB)
21	Metal Building System (MBS)
22	Service Station Canopy (SSC)
23	Warehouse Building [Tilt-up Walls or Heavy-Timber Construction] (WHB)
24	Transmission Line Towers (TLT)
25	Free-Standing Towers (FST)

National Weather Service DIs and an example Degree of Damage scale

Table 4.

One- and Two-Family Residences (FR12)

Typical Construction

- Asphalt shingles, tile, slate or metal roof covering
- Flat, gable, hip, mansard or mono-sloped roof or combinations thereof
- Plywood/OSB or wood plank roof deck
- Prefabricated wood trusses or wood joist and rafter construction
- Brick veneer, wood panels, stucco, EIFS, vinyl or metal siding
- Wood or metal stud walls, concrete blocks or insulating-concrete panels
- Attached single or double garage

DOD*	Damage description	EXP	LB	UB
1	Threshold of visible damage	65	53	80
2	Loss of roof covering material (<20%), gutters and/or awning; loss of vinyl or metal siding	79	63	97
3	Broken glass in doors and windows	96	79	114
4	Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward or outward; failure of porch or carport	97	81	116
5	Entire house shifts off foundation	121	103	141
6	Large sections of roof structure removed; most walls remain standing	122	104	142
7	Top floor exterior walls collapsed	132	113	153
8	Most interior walls of top story collapsed	148	128	173
9	Most walls collapsed in bottom floor, except small interior rooms	152	127	178
10	Total destruction of entire building	170	142	198

* DOD is degree of damage

Tri State Tornado: March 18, 1925

THE SOUTHERN ILLINOISIAN SUNDAY, MARCH 18, 2012

CONTACT Us: paul.newton@thesouthern.com 9A

- Missouri, Illinois, Indiana
- Path length of 219 miles and width of 3/4 mile
- Continued for over 3 hours
- 695 lives lost – still the record for any tornado in US history
- 2,027 injured
- 15,000 homes destroyed



Damage is shown in De Soto after the 1925 Tri-State Tornado.

PROVIDED BY JACKSON COUNTY HISTORICAL SOCIETY

Tornado records 1950-2021

Records of tornadoes in Perry County IL.
Source: NOAA storm events database

Location	Date	Rating	Deaths	Injuries	Property damage
	12/18/1957	F3	0	1	250000
	12/18/1957	F5	1	6	250000
	9/26/1959	F1	0	0	2500
	12/21/1967	F3	0	0	250000
	5/7/1973	F2	0	0	0
	6/17/1973	F0	0	0	0
	5/29/1982	F3	0	0	250000
	5/29/1982	F3	0	7	250000
OLD DUQUOIN	4/19/1996	F1	0	0	50000
SWANWICK	4/15/1998	F0	0	0	0
PINCKNEYVILLE	5/31/2001	F0	0	0	0
PINCKNEYVILLE	5/30/2004	F1	0	0	250000
CUTLER	3/11/2006	F2	0	2	1200000
SUNFIELD	6/8/2009	EF0	0	0	4000
DU QUOIN	6/8/2009	EF1	0	0	20000
CLINCH	6/19/2011	EF1	0	1	550000
SUNFIELD	6/19/2015	EF0	0	0	0
PINCKNEYVILLE	12/23/2015	EF1	0	0	175000
DU QUOIN	11/18/2017	EF0	0	0	250000
SUNFIELD	3/19/2020	EF1	0	1	300000



The Southern Illinoisian June
1, 1982

Derechos in Illinois

Currently no federal database of derecho events, any information from planning partners is welcome

- May 2009, winds across Southern Illinois lasted over an hour, wind speeds measured 106mph in Carbondale and 120mph in Murphysboro, many residents were without power for weeks, 1 person was killed
- August of 2020, a derecho went from Nebraska through Indiana. 850,000 acres of crops were damaged, 750,000 homes in Illinois lost power, 2 people were killed



THE SOUTHERN FILE PHOTO
The roofs of Royal Apartments on East Mill Street were torn off during the May 8 derecho.

C. Burdick, The Southern Illinoisan March 4 2021; C. Hale, The Southern Illinoisan Dec 27 2009

McFetridge, The Southern Illinoisian Apr 30 2021; R.Tronsco, The Southern Illinoisian Apr 12 2009

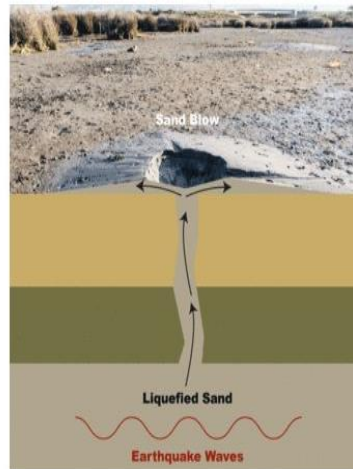
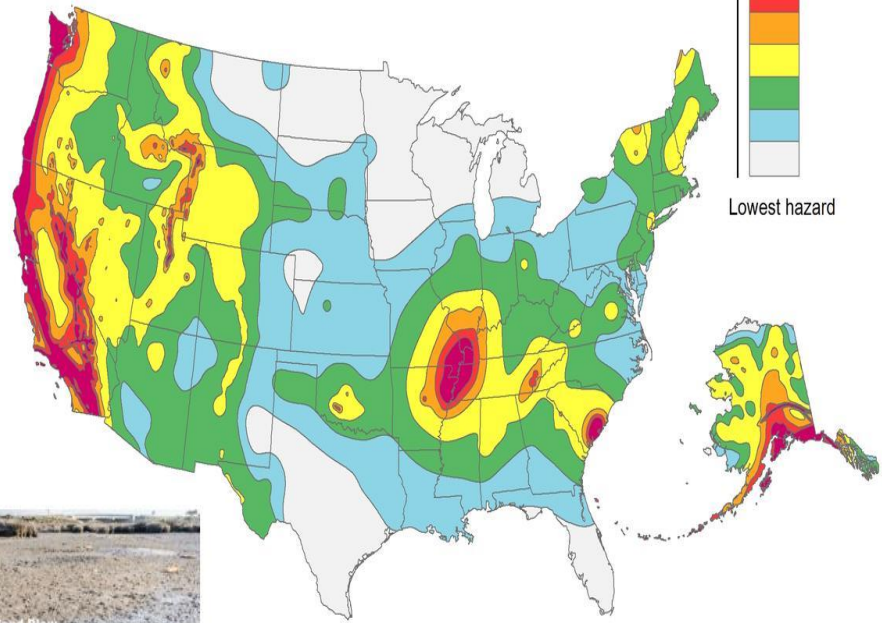
Photo from The Southern Illinoisian Oct 26.2009

Hazard Risk

- All of Perry county has the same risk of a tornado or derecho
- Derechos typically occur between May and August and are less common than tornados

2. Earthquakes

- Extent:
 - Magnitude- physical size of earthquake
 - Intensity- strength of shaking/levels of damage
- Effects: damaged buildings and infrastructure, sand blows, liquefaction, and landslides

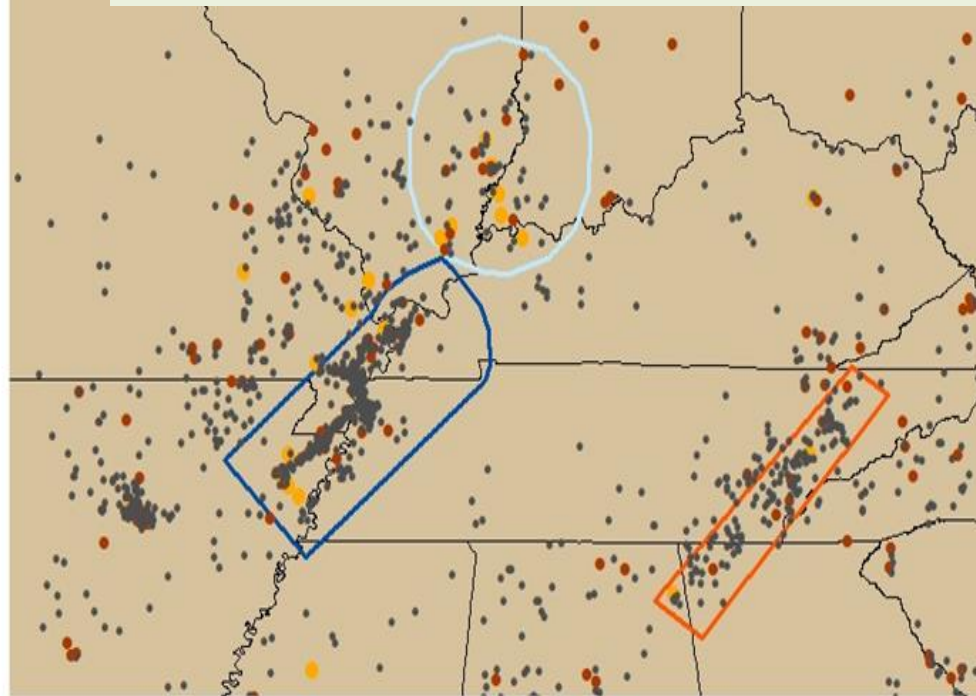


Photograph and schematic cross-section illustrating earthquake-induced liquefaction and formation of sand dikes and sand blows. The photo was taken on February 14, 2016 after the Christchurch, New Zealand earthquake. (modified from the original) (Credit: Martin Luff. Public domain.)

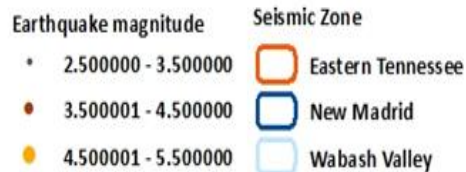
USGS long term earthquake risk model (2018)

https://www.youtube.com/watch?v=b_alm5oi5eA

Locations of seismic zones and past earthquakes in southern Illinois and surrounding areas from 1920 to 2021.



0 37.5 75 150 Miles



The only recorded earthquake in Perry county was a magnitude 3.2 in 04/06/1991.

Data Sources:
USGS
earthquake
catalog, USGS
2008 national

New Madrid Earthquakes

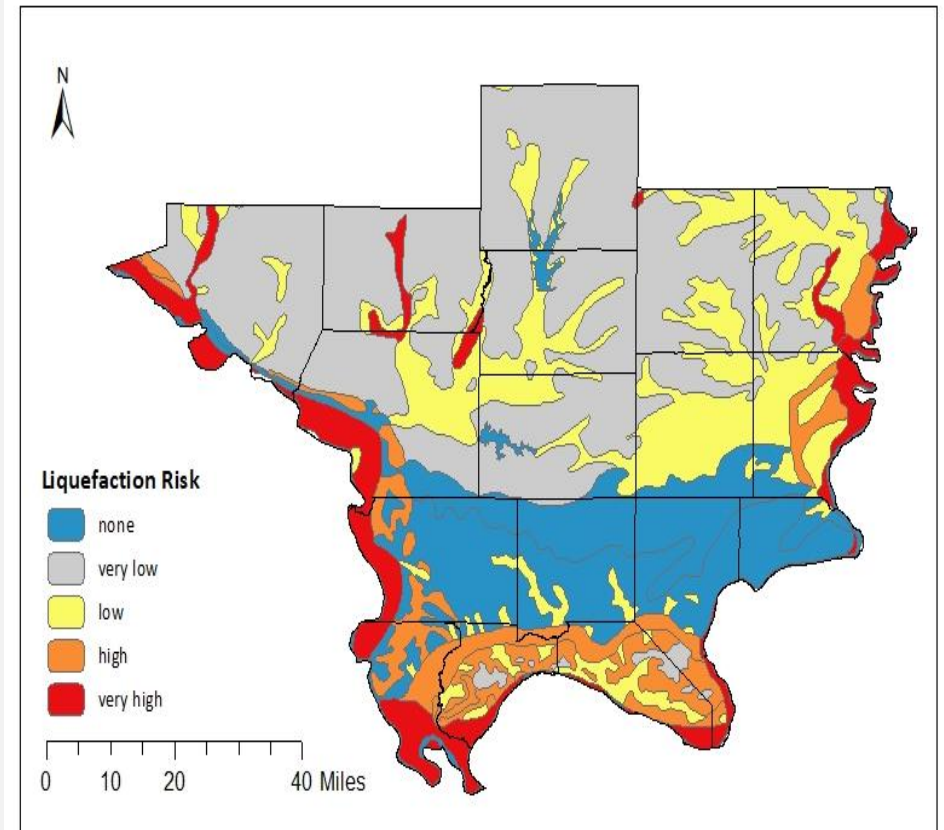
- December, January, February of 1811-1812
 - 3 large earthquakes, estimated magnitude 7, with hundreds of aftershocks
 - The February earthquake destroyed the town of New Madrid MO
 - Damage included river bank failure, landslides, sand blows, and reversal of the flow of the Mississippi
 - Among the 5 worst earthquakes to ever occur in the lower 48 states



An earthquake fissure that later filled with sand. [Myron L. Fuller, The New Madrid Earthquake (Washington, DC: US Department of the Interior, 1912)]

Risk

- Earthquakes could occur anywhere in Perry County
- Severe earthquakes (magnitude 7 or higher) within the New Madrid or Wabash Valley seismic zones can be felt hundreds of miles away from the epicenters
- Areas most at risk for liquefaction and sand blows are floodplains where the water tables is within 5 feet of the surface
- Severe earthquakes in the New Madrid seismic zone are estimated to occur every 500 years



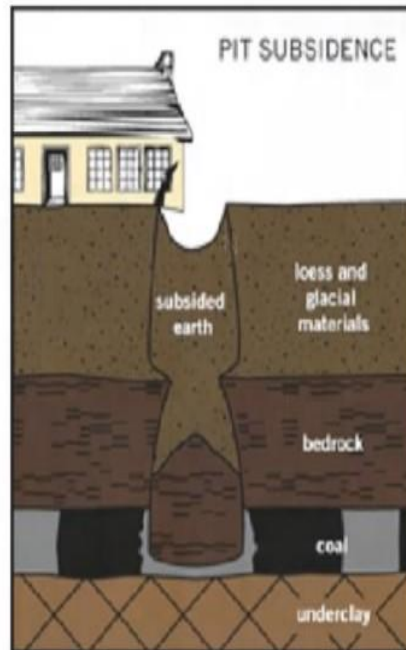
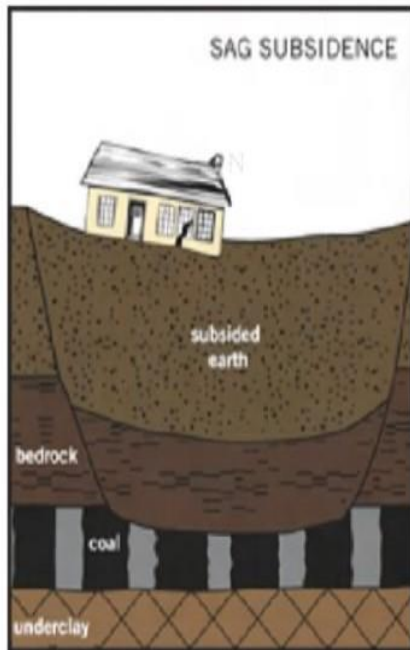
3. Ground Failure

Subsidence of the land due to sinkholes from karst features or underground mines

- Karst: types of bedrock that dissolve in water over time
 - Limestone and dolomite/dolostone
- Coal mining in IL since early 1800s
 - Many with poor historical records of location
- Extent: type (mine vs karst; pit, sag, or trough subsidence) and size of sinkhole
- Impacts: road closures, damage to underground facilities damage to buildings, lowering of water table, injury/death in cases of mining accidents or suddenly appearing sinkholes



The Southern
Illinoisian
September 25, 1970



PROVIDED

Sag subsidence (left), the most common type of mine subsidence, appears as a gentle depression in the ground and can spread over an area as large as several acres. Collapse of pillars supporting the mine roof is a typical cause. Pit subsidence (right), forms a bell-shaped hole 6-8 feet deep and from 2-40 feet across and occurs when a shallow mine roof collapses.

Left: The Southern April 1, 2013

Original diagram from Illinois Mine Subsidence Insurance Fund

Right: The Southern December 15, 1954

Bottom: The Southern March 25, 1990

Old Du Quoin Mine Collapses

Old mine workings, reaching under Du Quoin residences, caved in Monday and Tuesday leaving a 50-foot long hole in the backyard of Nick Gidak, 202 N. Line St.

During the cave-in two sections of concrete sidewalk were swallowed up. The earth's first and largest collapse occurred less than 10 yards from Mrs. Gidak as she entered the house. Water gushed up from the hole.

Gidak, himself a former miner, said the cave-in, which lies in a northwest-southwest direction across his garden area, occurred in

Some subsidence claims fall through gaping loophole

By Pete Rosenberg
Of The Southern Illinoisan

Expanding the existing mine subsidence law was one of three ideas West Frankfort area residents heard Saturday from U.S. Rep. Glenn Poshard.

Poshard said the 11-year-old Illinois Mine Subsidence Insurance Fund approved by state legislators allows subsidence claims to be paid only in cases of mine collapse.

That was news to many of the residents, including Virginia Bryant of West Frankfort, who helped

spearhead the meeting.

Bryant labeled the provision is a "legal loophole" and said residents were unaware of the strict wording.

"This is a total shock and surprise to us," she said.

Poshard, a Cartersville Democrat, met with about 30 residents in a public forum Saturday to discuss what he had learned after meeting with a representative of the insurance fund early last week.

There have been increasing concerns that claims filed with insur-

'I'm not blaming the (insurance) companies; I'm blaming the process.'

U.S. Rep. Glenn Poshard

ance companies were not being paid through the fund, although properties were affected by mine subsidence.

Although a mine does not have to collapse for subsidence to occur, Poshard, who met with Illinois Mine

Subsidence Insurance Fund general manager Edmund Murphy last week, said he was told that if the subsidence is not related to a mine collapse, the insurance companies don't have to pay claims.

Poshard said he does not believe

the narrow interpretation of the law was the legislative intent when the mine subsidence fund was established in 1979. He said any legislator "certainly would have been thinking subsidence; not collapse."

In fact, Poshard said, the information booklet given to people when subsidence insurance is purchased — along with wording on insurance premiums — alludes only to mine "subsidence" and not mine collapse.

The narrow interpretation of the law by both the insurance companies and the commission that over-

sees the fund regarding subsidence claims have been upheld in legal challenges, Poshard said.

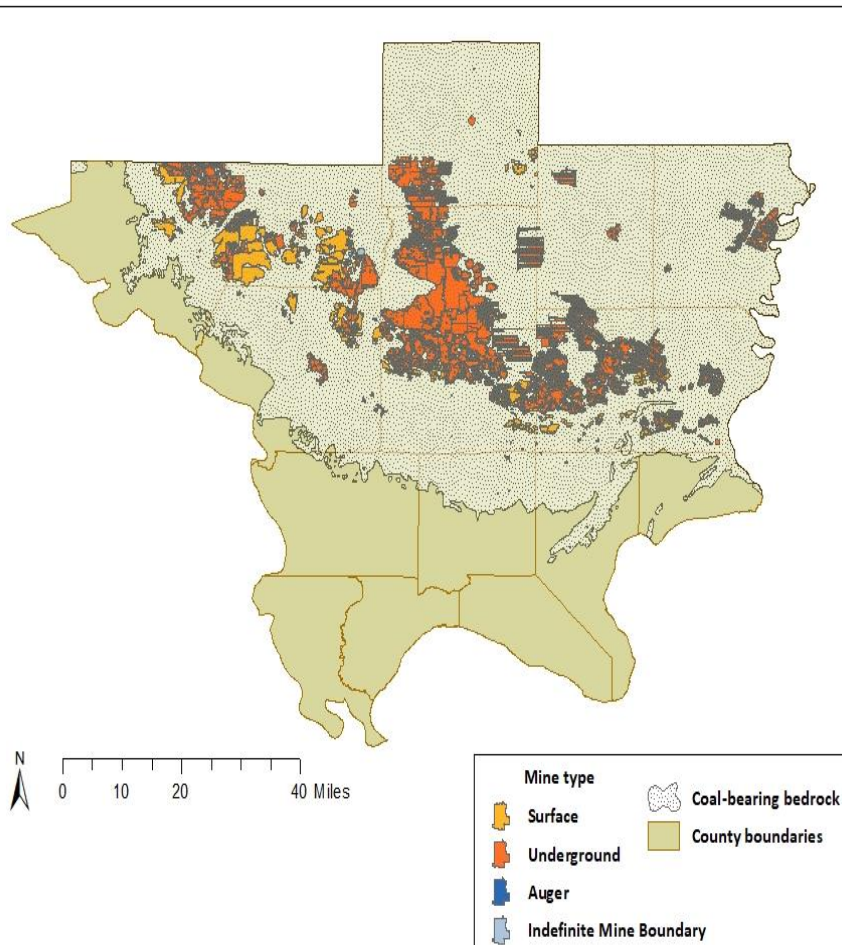
The legislature needs to make clear what subsidence means, he said.

"If they mean it to mean mine collapse ... then things aren't going to change," Poshard said.

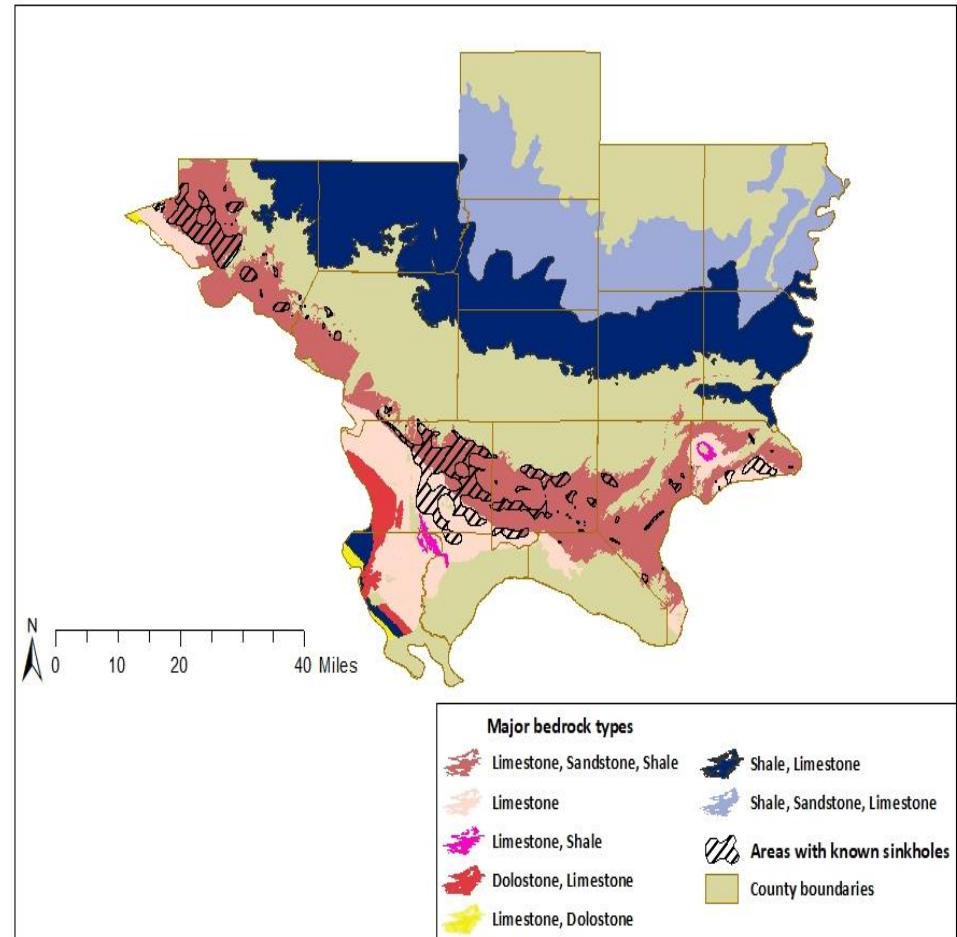
If the law is meant for mine subsidence "and all the other things associated with a huge hole in the ground 200 feet below your house," the wording could be legislatively

See Subsidence, A2

Locations of known and suspected coal mines in southern Illinois



Locations of karst bedrock and known sinkholes in southern Illinois



Data Sources: Illinois State Geological Survey (ISGS)

Historical ground failure

- ❖ No national or state database for mine-related sinkholes
- ❖ Data below compiled from local newspaper archives

County	Municipality	Year	# of subsidence events	Type of subsidence	Diameter	Depth
Perry	Du Quoin	1954	1	Mine	50ft	
Franklin	Zeigler	1970	1	Mine	no visible hole formed	NA
Williams	Energy	1979	2	Mine		
Williams	Energy	1981	1	Mine	100ft	
Williams	Energy	1981	1	Mine	25ft	50ft
Williams	Energy	1981	1	Mine	25ft	15ft
Franklin	Sesser	1986	1	Mine	5ft	27ft
Jackson	Dowell	1986	1	Mine		
Williams	Energy	1992	1	Mine	20ft	12ft
Union	Dongola	1993	3	Karst	10ft, 10ft,	6ft, 6ft, 50ft
Williams	Cambria	1996	1	Mine	22 by 12 ft	81ft
Williams	Johnston City	2007	1	Mine	NA	NA

Watch your step: Another 'mine' sinkhole pops up on east side of Du Quoin



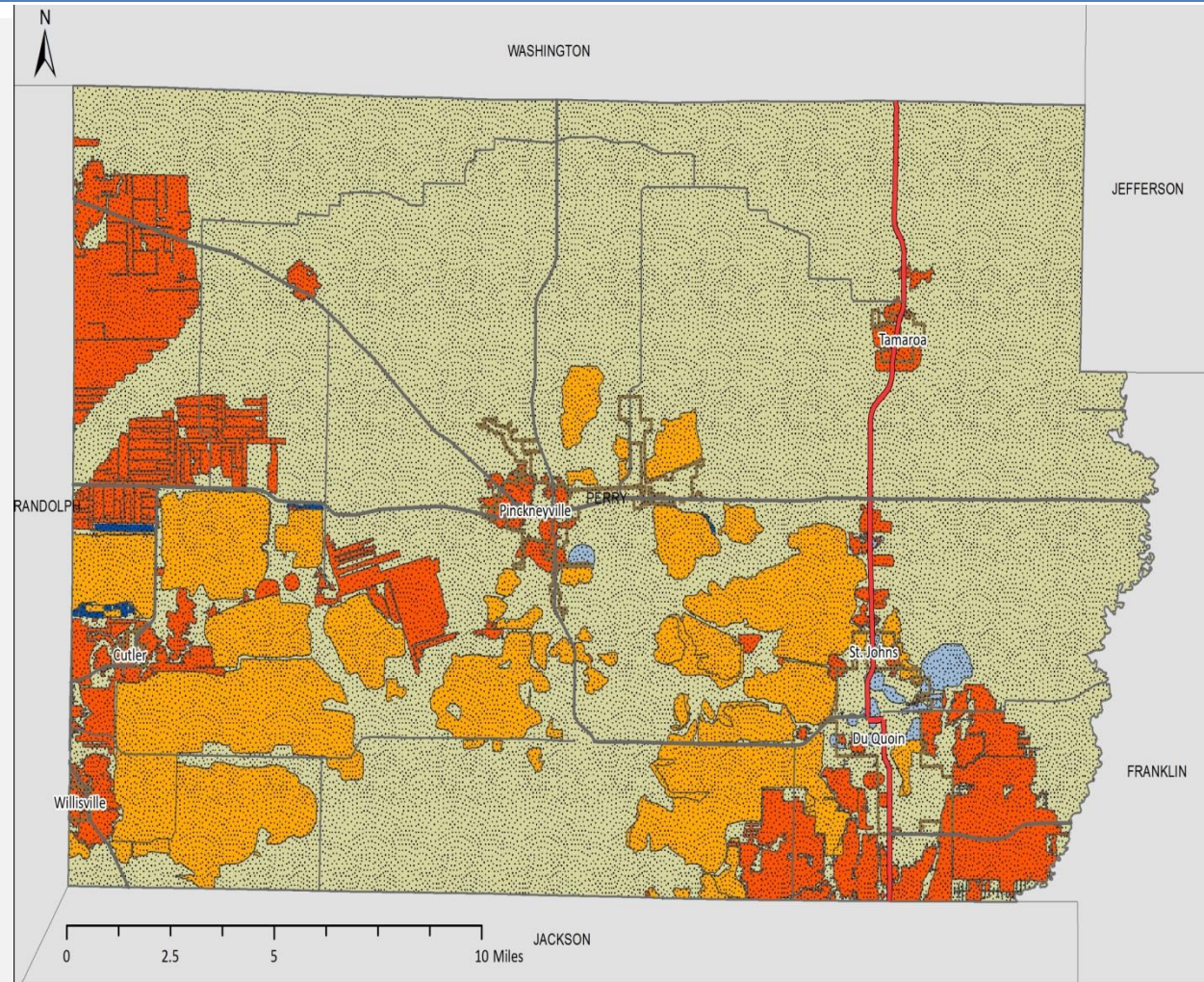
Avenue between North Vine and Grafway streets. The sinkhole is about 8 feet across and 14 feet deep.

City of the City of Du Quoin/Facebook

R. Trappe, Benton News
2.29.2020

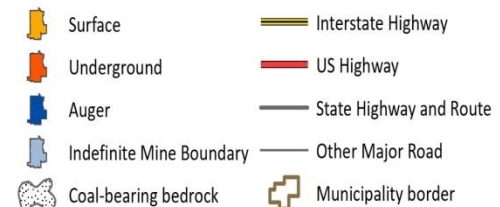
Risk

- Highest risk are areas over underground mines
- Karst sinkholes are not a major concern



Locations of known and suspected coal mines in Jefferson county

Mine type



4. Floods

Flash Flood: rapid flooding of upstream tributaries and/or urban areas when drainage systems become overwhelmed

Riverine Flood: widespread, long lasting flood conditions of major rivers



In June, the Chester Bridge and Highway 51 disappear into the Mississippi River approaching McBride, Missouri.

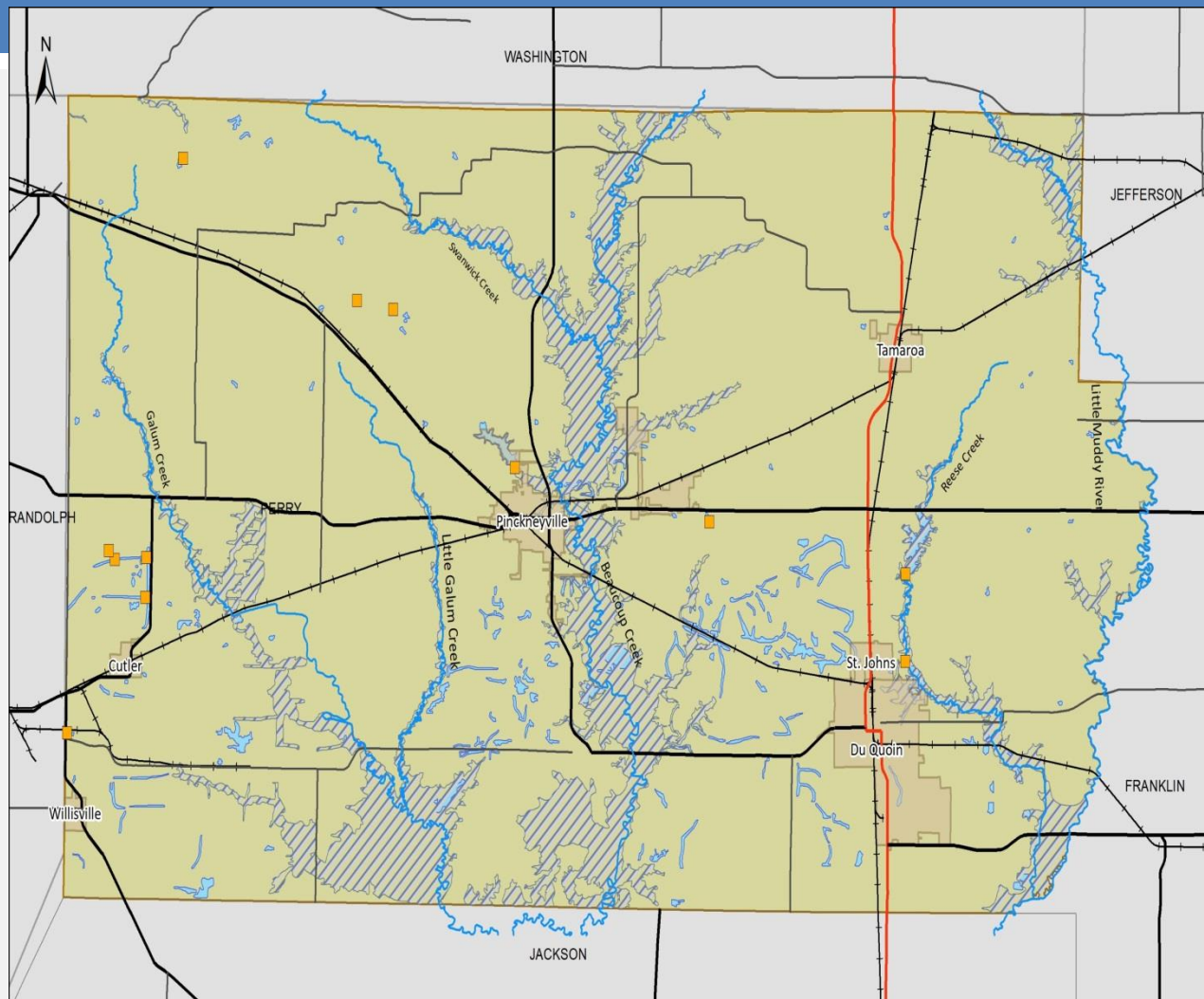
Courtesy of Joggerst Aerial Photography/Used with permission

Dam failure

Usually caused by

- Flooding that exceeds dam height
- Internal erosion
- Mechanical failure
- Earthquakes
 - Unlikely for IL dams, as most are earthen rather than concrete

- Extent: measured in water depth, speed of onset, duration of flood conditions, % of dam function lost
- Impacts:
 - loss of life, damaged buildings and infrastructure, damaged crops
 - Combined Sewer Overflows, increased water pollution
 - secondary impacts from loss of power/services, changes in hydrology, and



100 year floodplain and dam locations for Perry County, IL

Dams cont.

- Database maintained by U.S. Army Core of Engineers
- Incident/failure databases maintained by The Association of Dam Safety Officials (ASDSO) and the National Performance of Dams Program (NPDP)
- Dams in Illinois are not required to have Emergency Action Plans

Edenville dam failure in Midland County, MI which occurred in May 2020 after heavy rains produced a 500 year flood event, the dam was built in 1925 and was in need of multiple repairs when the failure happened. 10,000 people were evacuated and 2,000 homes were



Dam Name	River	City	Year Built	Hazard Potential	EAP
LAKE DUQUOIN DAM	REESE CREEK	DUQUOIN	1937	S	N
PINCKNEYVILLE RESERVOIR DAM	OPOSSUM CREEK	PINKNEYVILLE	1953	S	Y
NEW CHERRY LAKE DAM	REESE CREEK	DUQUOIN	1969	S	N
KNIGHT HAWK COAL/PRAIRIE EAGLE MINE/010B SLURRY DAM	TRIB GALUM CREEK	CUTLER	2006	S	Y
KNIGHT HAWK/PRAIRIE EAGLE/SLURRY 012C DAM	TRIB GALUM CREEK	CONANT	2016	S	Y
KNIGHT HAWK/PRAIRIE EAGLE/NORTH REFUSE AREA DAM	TRIB GALUM CREEK	CUTLER		S	Y
MILLERS CAMPGROUND LAKE DAM	TRIB COX CREEK			S	N
RED HAWK DAM	PANTHER CREEK	VERGENNES	1930	L	N
FOERICH POND DAM	TRIB MUD CREEK	NEW ATHENS	1953	L	N
KNIGHT HAWK COAL/PRAIRIE EAGLE MINE/SLURRY DAM 010	NONE	CUTLER	2006	L	N
PRAIRIE COAL/LOST PRAIRIE MINE/SEDIMENT POND 1	TRIB WOLF CR	PINCKNEYVILLE		L	N
PRAIRIE COAL/LOST PRAIRIE MINE/SLURRY POND 1	TRIB WOLF CR	PINCKNEYVILLE		L	N

No recorded incidents for Perry County dams
The national average age of dams in the US is 57 years, the average age in Perry County is 47 years

Left: Location, age, and hazard potential of all dams in Perry County, IL

All dams are regulated and inspected by Illinois Department of Natural Resources (IDNR)

Flood Records 1996–2021

Flood Events in Perry county

Source: NOAA Storm Events Database

Location	Date	Injuries	Property Damage
DU QUOIN	4/3/1999	0	0
PINCKNEYVILLE	7/12/2000	0	0
DU QUOIN	7/18/2001	0	0
COUNTYWIDE	5/8/2002	0	7000
PINCKNEYVILLE	12/18/2002	0	0
SWANWICK	3/18/2008	0	250000
DENNY	4/10/2008	0	0
TODDS MILL	12/25/2009	1	5000
CLINCH	4/24/2011	0	0
CLINCH	5/1/2011	0	30000
DU QUOIN	12/28/2015	0	0
ST JOHNS	8/14/2016	0	0
CLINCH	9/16/2016	0	0
PINCKNEYVILLE	5/18/2018	0	0
SUNFIELD	12/15/2018	0	0
DU QUOIN	3/24/2019	0	0

Flash flood events in Perry county that caused property damage

Source: NOAA Storm Events Database

Location	Date	Property Damage
PINCKNEYVILLE	4/28/1999	220000
DU QUOIN	6/29/1999	50000
OLD DUQUOIN	4/30/2011	30000
DU QUOIN	7/29/2011	20000
DU QUOIN	9/8/2018	15000
DU QUOIN	6/16/2000	10000
DU QUOIN	7/11/2009	10000
CUTLER	1/12/2011	10000
PINCKNEYVILLE	5/11/2016	10000

Risk

- Flash floods may occur anywhere during heavy rainfall, impacts are generally more severe in urban areas where there are impervious surfaces, and along low lying roadways
- Riverine flood risk is limited to areas surrounding larger streams and tributaries:
 - Little Muddy river
 - Beaucoup creek
 - Galum creek
- Dam failure risk is limited to the maximum area that could be flooded, depends on size of reservoir and how much of the dam fails

Harrisburg Fire Department rescues 4 teens from flooded roadway

Facebook Twitter Print



1 2



The north end of Brier Creek Road, where it intersects Ingram Hill Road, remains closed from flooding.

TRAVIS DENEAL PHOTO

By Travis DeNeal

tdeneal@dailyregister.com

updated: 1/15/2020 11:57 AM

HARRISBURG -- Four Harrisburg teens are safe after being rescued from flood waters outside of Harrisburg Friday night.

Climate impacts on flooding

Study says triple the population is at risk of climate-triggered floods

SETH BORENSTEIN
Associated Press
WASHINGTON



because those areas use
airborne lidar radar, which
is more accurate about true

The Southern
Illinoisian
Oct30.2019

- Extreme precipitation is expected to increase with the warming climate, which in turn increases the frequency and intensity of floods. Springtime precipitation is expected to increase in southern Illinois by 10-15% by 2050
- 2019 was the 2nd wettest year on record, with \$6.2 billion in damages just for states along the Mississippi river
- The upper Mississippi river was listed as the most endangered waterway in the US in 2020, with severe floods driven by climate change as a major factor.

Flood relief options

- National Flood Insurance Program
 - Managed by FEMA
 - Participating communities must adopt and enforce floodplain management plans to be eligible
 - Required for homes and businesses in high risk areas, others in moderate to low risk may purchase flood insurance
- Disaster Declarations
 - Must first be made by state governors
 - President must determine appeals to declare federal disasters
 - 3 types of FEMA assistance during disasters
 - Individual (7.5million threshold)
 - Public (19.2 million threshold)
 - Hazard mitigation

Does your community participate in	
Municipality	participation?
Cutler	no
Du Quoin	yes
Pickneyville	yes
St Johns	no
Tamaroa	no
Willisville	no

LOCAL FLOODING

Damage assessed over \$13M

State is almost at limit to receive federal aid

GABRIEL NEELY-STREIT
The Southern

CAIRO — Deep Southern Illinois has tallied flood damage in excess of \$13 million to roads and other public facilities, according to local officials, putting the state well on the way to reaching the threshold to receive federal aid.

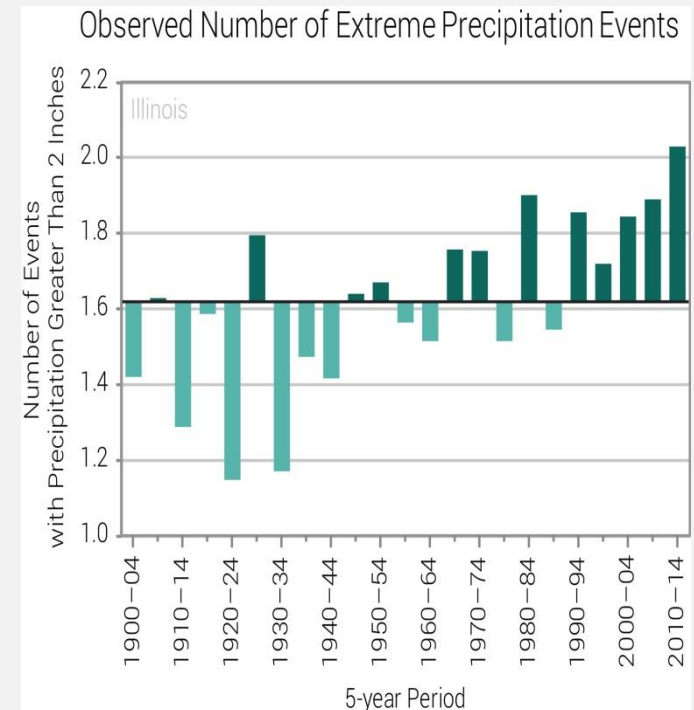
The Illinois Emergency Management Agency asked counties to turn in their preliminary flood damage reports by Monday.

Please see **FLOOD**, Page A6

The Southern July 24, 2019

Severe weather: thunderstorms

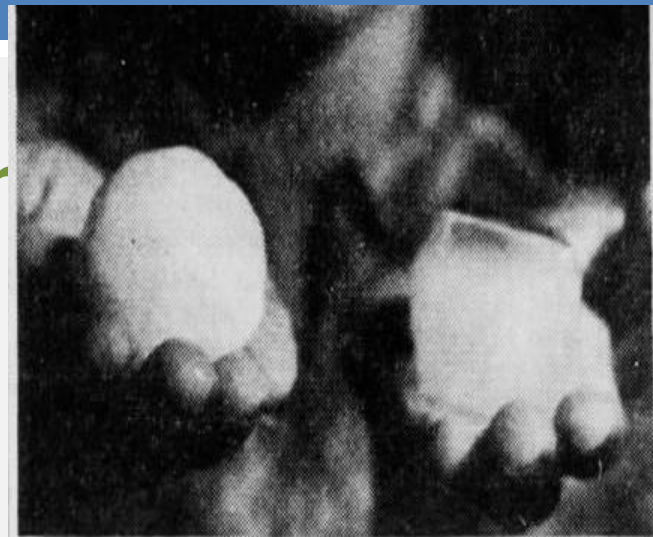
- Extent: winds of at least 58mph, 1in diameter hail, or produce a tornado
 - or a combination of 40mph winds with 1/2in diameter hail
- Impacts: Death/injuries from lightning and hail, damage to trees, buildings, infrastructure, agriculture
- Record number of extreme precipitation events from 2010-2014, trend expected to continue



NOAA State Climate Summaries:
Illinois

Historic Records 1950–present

- 112 total records of thunderstorm winds, 7 injuries, 67 property damage records
- 68 total records of hail, 3 of which caused property damage
- 2 records of lightening causing property damage



HAIL, HAIL

Helen Hughes of Omaha, Neb., holds an ice cube at right and a hailstone at left. The hail fell in Carbondale during an electrical storm Monday. She is visiting her grandparents, Dr. and Mrs. H. W. Patterson, 105 N. University, Carbondale.

Cooler In Area

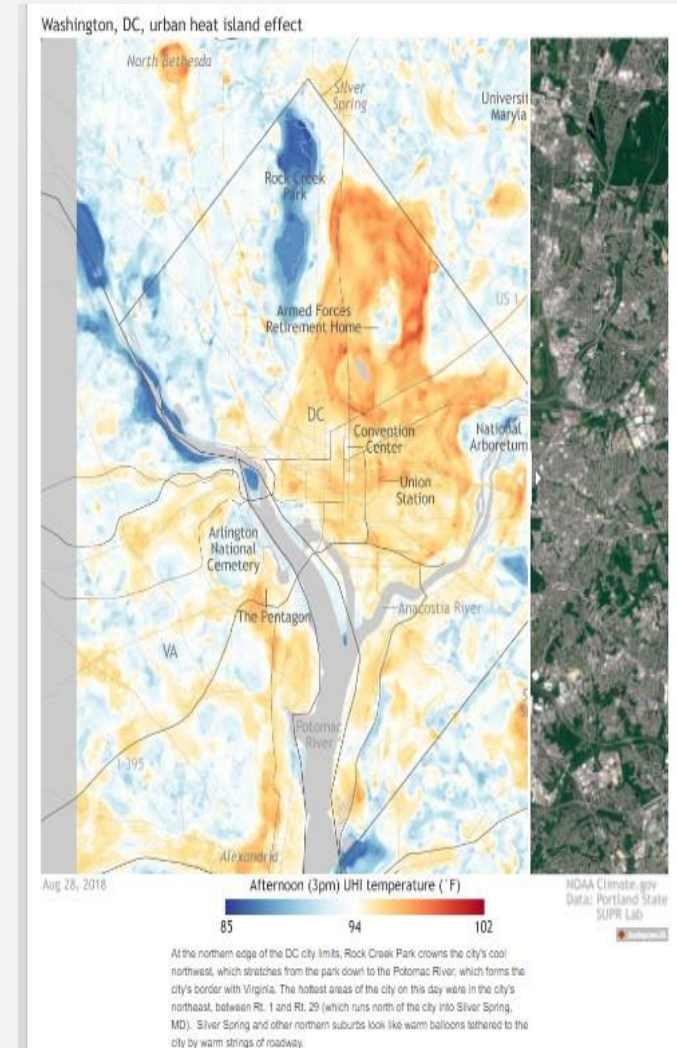
Hail Damages Apple Crop As Rain, Lightning Strike

Hail hitting orchards south of Murphysboro and Carbondale damaged apples during a brilliant rain and lightning storm. An oil tank flare, starting a grass fire at 400 S. Locust St., West Frankfort, at 7:45 p.m.

The Southern Illinoisian June 11, 1963

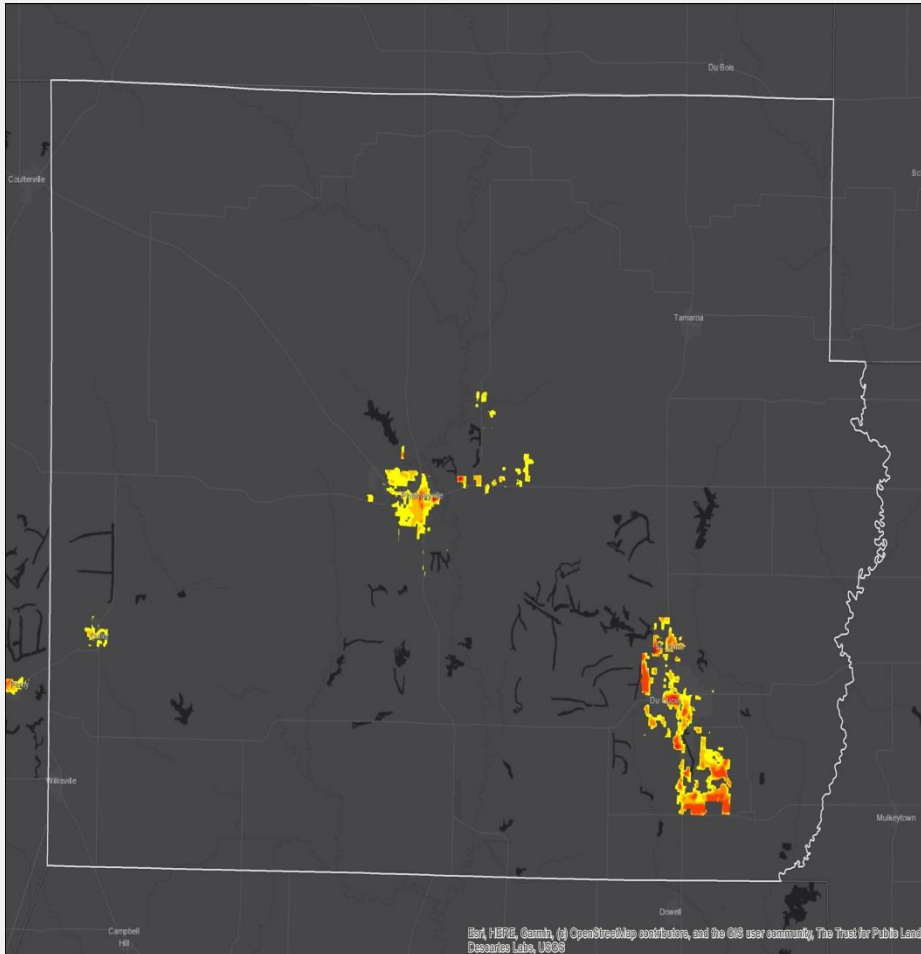
Severe weather: drought and excessive heat

- Extent: extended period of time with below average rainfall and excessive heat
 - Palmer Drought Severity Index (PDSI): an estimate of relative dryness on a scale of -10 to +10
- Impacts: heat related illness/death, disrupted growth cycles, loss of crops, wildfires, harmful algal blooms, loss of freshwater habitat, Urban Heat Island effects
- Frequency and intensity of droughts expected to increase with climate patterns



R. Lindsey, "Detailed maps of urban heat island effects in Washington, DC, and Baltimore," *Climate Central*, 2016.

Urban Heat Islands



Data sources: The Trust for Public Land, Descartes Lab, ESRI base map

- 1-7 degrees hotter than surrounding natural areas
- Increased air pollution
- Higher risk of heat- related illness
- Lower water quality
- Higher energy bills

Harmful Algal Blooms (HABs)

- Form in nutrient-rich warm waters from cyanobacteria
 - Effects: toxins produced, decreased light and dissolved oxygen in water
 - Secondary economic effects from decreased tourism and fisheries population declines



LYNNE SLADKY, ASSOCIATED PRESS

An algae bloom is seen in 2018 on the Caloosahatchee River in Alva, Fla.

Left: The Southern Aug 23, 2019
Bottom: The Southern February 1, 2019



Historic Records

- 21 drought records (1998-2012)
 - One drought in 2007 caused \$3.45 million in crop damage
- 11 records of excessive heat (2010-2019)
- No public databases of HAB occurrences, have been known to occur in late summer on Campus Lake in Carbondale, can occur in any lake during heat waves

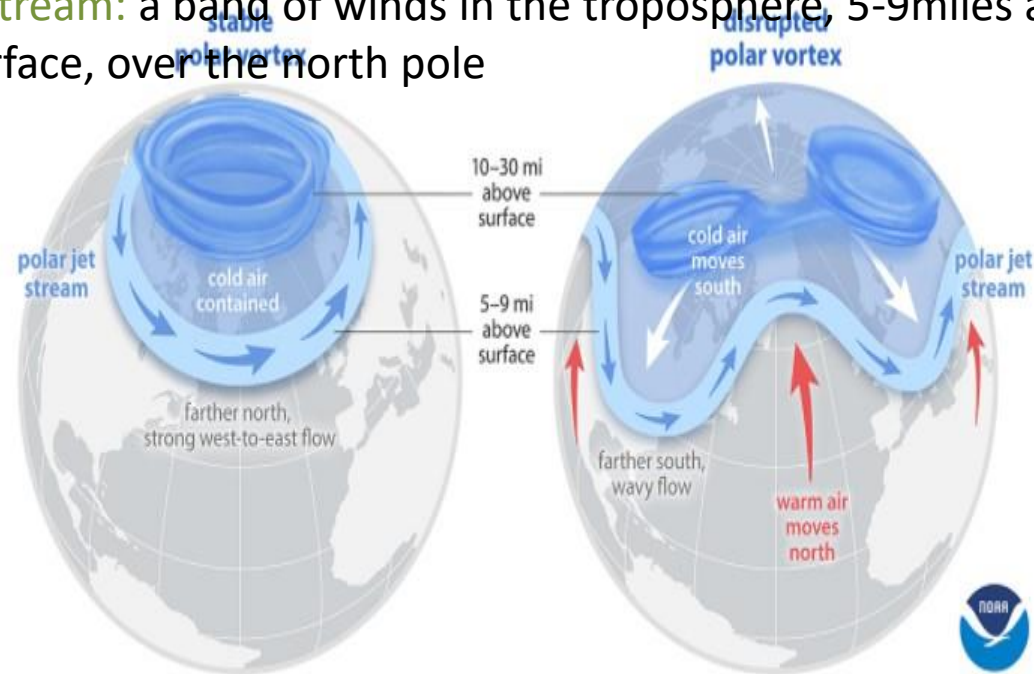
Severe weather: winter storms

- Extent: storm event that produces 6+ inches of snow in 48 hours. Ice accumulation and high wind speeds
- Impacts: Dangerous road conditions, disrupted traffic and increased accidents, power outages, damage to buildings and infrastructure, frostbite and hypothermia risk, loss of livestock
- Pattern of increasing heavy snowfall events over the past decade for the eastern US.

Some, but not all severe winter storms are related to the polar vortex and jet stream

- NOAA Definitions

- **Polar vortex:** A band of strong westerly winds that rotate in the stratosphere, 10-30 miles above the surface of the earth, over the north pole. These winds enclose extremely cold air
- **Polar Jet Stream:** a band of winds in the troposphere, 5-9 miles above the earth's surface, over the north pole



Historic records 1996–present

- 27 total records of winter storms, three that have caused property damage (2008, 2016)
- 16 total records of

Right: The Southern Illinoisian Feb 17, 2021
Bottom: The Southern Illinoisian Feb 16, 2021

wind chill/extreme Millions left without power as 2014 massive winter storm slams US

**PAUL J. WEBER AND
JAKE BLEIBERG**
Associated Press

AUSTIN, Texas — A frigid blast of winter weather across the U.S. plunged Texas into an unusually icy emergency Monday that

Electric Reliability Council of Texas. He defended preparations made by grid operators and described the demand on the system as record-setting. “This event was well beyond the design parameters for a typical, or even an ex-



Parts of region see 10 inches of snow

Additional accumulation
in Wednesday forecast

MARILYN HALSTEAD
The Southern

A winter storm on President's Day — which some are calling Snowmageddon 2021 — blanketed Southern Illinois in snow, with most of Southern Illinois, Western Kentucky and Southeastern Missouri receiving 5 to 9 inches of snow. More snow is

Severe weather – Risk

- Equal risk throughout county
- Climate change in the Midwest is altering historic wet/dry regimes; increasing frequency and severity of both drought and heavy precipitation

Hazardous Materials Release

- Unintentional release of any material that may cause harm to human health or the environment or cause damage to critical facilities and infrastructure.
- Extent and impacts vary
- Risk areas include major highways, railroads, barge routes, and factories/warehouses/

2 die in Houston warehouse blast

Officials think explosion was accident; nearby buildings are damaged

JUAN A. LOZANO
Associated Press

HOUSTON — A massive explosion Friday leveled a warehouse in Houston, leaving at least two people dead, damaging nearby buildings and homes and rousing frightened residents from their sleep miles away, authorities said.

buildings suffered heavy damage to parts of their walls and roofs.

Police Chief Art Acevedo confirmed the deaths Friday and said it was likely both people worked for the company. He said a family member of one of the people suspected to have died was a U.S. Marine currently training at Camp Lejeune, North Carolina, and called on the Marines to let the man return to Houston.

Authorities don't believe the explosion was intentional though a criminal investigation is under-

Tractor-trailer spill jams up I-57

BY BECKY MALKOVICH
THE SOUTHERN

WILLIAMSON COUNTY — Traffic was snarled for hours after a tractor-trailer carrying a “disinfectant, liquid, corrosive” overturned on Interstate 57 Tuesday night.

The crash occurred when Cameron D.

southbound lane and partially blocking the right southbound lane, state police said.

The truck spilled some of its load, a hazardous material identified as “disinfectant, liquid, corrosive.”

Hazardous material cleanup crews were called shortly after the 8 p.m. crash, state police said.

Peters, who was uninjured in the crash, was cited for improper lane usage.

Assisting agencies included West Frankfort fire and police departments, Herrin and Johnston City police, Williamson County Fire Protection District, Marion Fire Department HAZMAT Team, Williamson County Emergency

Above: The Southern Illinoisian January 25, 2020

Left: The Southern Illinoisian January 16, 2014

Evacuation ordered after fire, explosion at IL chemical plant

**SARA BURNETT
AND DON BABWIN**
Associated Press

CHICAGO — An explosion at a northern Illinois chemical plant Monday morning sparked massive fires that sent flames and huge plumes of thick black smoke high into the air and debris raining onto the ground, prompting evacuations.

After 7 a.m., emergency crews rushed to the scene of the fire near Rockton, northwest of Chicago, at Chemtool Inc., a company that manufactures lubricants, grease products and other fluids, and is, according to the company,



STACEY WESCOTT, ASSOCIATED PRESS

Flames and smoke are seen from an explosion at a chemical plant in Rockton on Monday, June 14, 2021.

The Southern, June 15, 2021

Current Hazardous Materials Data

- Federal Emergency Planning and Community Right to Know Act (EPCRA) of 1986: Any facility that uses or stores certain thresholds of federally mandated substances must report annually to state and local officials; any releases that occur must be reported immediately.
 - Implemented in the state by Illinois Emergency Management Agency (IEMA)
- **Review and update if necessary**
 - Perry County Local Emergency Planning

Facility Name	City	Address	Contact Person	Chemical Name	Chemical Quality (lbs.)
BICCGENERAL CABLE INDS. INC.	DU QUOIN	1453 S. WASHINGTON ST.	KEITH MCLAIN	ACETOPHENONE	4
BICCGENERAL CABLE INDS. INC.	DU QUOIN	1453 S. WASHINGTON ST.	KEITH MCLAIN	ANTIMONY	4
BICCGENERAL CABLE INDS. INC.	DU QUOIN	1453 S. WASHINGTON ST.	KEITH MCLAIN	COPPER	7
BICCGENERAL CABLE INDS. INC.	DU QUOIN	1453 S. WASHINGTON ST.	KEITH MCLAIN	DECABROMODIPH ENYL OX	5

Invasive Species / Exotic Weeds

Any organism non-native in an ecosystem whose introduction causes or is likely to cause harm to the economy, environment, or human health (Executive order 13112).

Illinois defines **exotic weeds** as plants not native to North America that when planted, spread vegetatively or naturalize and degrade natural communities, reduce the value of fish and wildlife habitat, or threaten Illinois endangered or threatened species (525 ILCS 10).

- Extent: varies considerably by species
- Impacts: Disruption of natural ecosystem processes, damage to native populations, property damage, decrease value of timber stands, decrease crop yield, decrease water quality, damage infrastructure, disease spread
 - Power companies spend approximately \$60million annually to control zebra mussels (US dept of state archives)
 - Autumn olive removal at Pyramid State Park is expected to cost \$103,000 (Les Winkler, The Southern)



LES WINKLER PHOTOS, THE SOUTHERN

Autumn olive bushes cover a hillside bordering a Pyramid State Park Lake. The Illinois Department of Natural Resources is using herbicides to eradicate the invasive species.

Autumn olive eradication at Pyramid State Park

LES WINKLER
The Southern



Zebra mussels invade region

By Phil Brinkman
Of The Southern Illinoisan

Zebra mussels, the prolific, fingernail-sized mollusks whose North American debut in the Great Lakes five years ago alarmed marine biologists, likely have taken up residence in waterways throughout Southern Illinois, researchers say.

Sightings of the mussels have been confirmed in the Ohio River as far south as Olmstead, and in the Mississippi River as far south as Alton. However, given the mus-

U.S. Rep. Richard Durbin, D-Springfield, is aimed at finding a way to stem the tide of the destructive mollusks.

Zebra mussels, so called because of their striped shells, are a European species inadvertently introduced into the Great Lakes through the discharged ballast water of commercial ships.

Their ability to filter all the nutrients from enormous amounts of water, essentially removing the bottom link of the food chain, presents a possible threat to freshwater ecosystems. If allowed to spread, they

based economies by forming encrustations on recreational and commercial boats, and smothering some species of native mussels.

Jon Stanley, director of the National Fisheries Research Center-Great Lakes, in Ann Arbor, Mich., said the number of native clam species in Lake St. Clair decreased from 14 to two over a 3-year period of zebra mussel infestation.

"The concern is that this will be the last straw for many of these endangered species," Stanley said.

In his testimony, Sheehan proposes con-

triploidy, as the process is known, has been used to control populations on other species, such as the Mediterranean fruit fly and some commercially produced oysters, a relative of the zebra mussel.

To succeed, Sheehan said, a large enough number of sterile mussels must be introduced for their gametes to compete. Though such an introduction would seem to exacerbate the population problem, Sheehan said the operation actually presents a unique opportunity by placing them near effluent

stances up to 100 times their density in surrounding water.

Moreover, because they do not move once they are attached to something, the sterile mussels could be inserted in the effluent stream on artificial surfaces, such as ropes or plates. As the mussels start to clog the outlets, the surfaces could be removed and the pollution-laden mussels removed.

All the while the sterile mussels are growing and thriving on the organic matter from the sewage effluent, Sheehan said, they are

Left: Southern Illinoisian Sept 15 2019

Bottom: Southern Illinoisian Nov 11 1991

Bottom right: Southern Illinoisian Feb 20 2021

New Florida mosquito species 'very aggressive'

ADRIANA BRASILEIRO
The Miami Herald

MIAMI — South Florida ap-

health or to animals in South Florida, Vasquez said.

"This species is not very well established yet, so we have not seen any cases of disease transmission. But we will keep an eye on it as we do with other mosquitoes that live here," he said. Miami-Dade monitors more than 320 mosquito traps set throughout the county to analyze species and prevalence in different areas.

Health officials reported more than 60 locally transmitted cases

Right: Southern
Illinoisian Mar 29
2020

Bottom: southern
Illinoisian Feb 14

SIU²⁰¹⁸ receives 115-pound black carp specimen

TIM CROSBY
SIU Media Services

CARBONDALE — Southern Illinois University Carbondale researchers this weekend received what is believed to be the largest specimen of black carp ever brought in for scientific analysis.

The fish, a 115-pound female caught Thursday by commercial fishers on the Mississippi River near Cape Girardeau, could help unlock important secrets about the invasive species, including its range, health and reproductive potential in that river and its larger tributaries, said Gregory Whitledge, associate professor of zoology at SIU.

SIU took possession of the fish Friday, after the fishers contacted the university. SIU manages a program funded by the Illinois Department of Natural Resources that pays commercial fishers for black carp that they catch and turn over to the university for scientific research.

Zoologists hope new specimen will shed light on an invasive species

During the weekend, researchers, including graduate student Hudman Evans, who is writing his



SIU MEDIA SERVICE

Southern Illinois University Carbondale graduate student Hudman Evans stands with what is believed to be the largest specimen of the invasive fish species black carp ever brought in for scientific analysis.

Lusk Creek Wilderness area to close to remove feral pigs

MOLLY PARKER
The Southern

The Shawnee National Forest plans to temporarily close the Lusk Creek Wilderness area in Pope County beginning Monday as officials take steps to eradicate a small but problematic feral pig population.

The closure will last through next Friday, April 3, the Shawnee National Forest said in a news release.

The feral swine eradication operation is a joint effort between the Shawnee National Forest and Animal and Plant Health Inspection-Wildlife Services, which both operate under the umbrella of the U.S. Department of Agriculture.

Feral swine are an invasive species recently documented living and breeding within and around the Lusk Creek Wilderness area. It is believed that the population is relatively



PROVIDED

Feral swine are an invasive species recently documented living and breeding within and around the Lusk Creek Wilderness area in Pope County.

small due to early detection.

Feral swine are an invasive species that compete with wildlife for food resources and prey on turkey and quail nests, reptiles, amphibians, and other wildlife including threatened and endangered species.

They are a serious threat to forest and wildlife resources in Illinois through competition with native wildlife for food and cover, destruction of habitat, and destruction of sensitive natural areas, according to the Shawnee National Forest. Further, infected feral swine

can transmit diseases and parasites to humans, wildlife and domestic livestock, such as horses and cattle. Natural habitats among Shawnee lands, including sensitive wilderness lands, are not capable of sustaining damage from feral swine without significant ecological consequences.

"We apologize for any inconvenience this may cause; however, we believe it is imperative that control measures are taken now while the feral swine population is small and localized," the Shawnee's news release said.

The closure will prohibit any public access to the site, and area residents may notice an increased presence of USDA personnel in the project area.

molly.parker@thesouthern.com
618-351-5079

On Twitter: @MollyParkerSi

Disease Outbreak/ Pandemics

- Detailed planning and preparedness guides available from FEMA
- Other agencies involved in pandemic planning & mitigation include US Department of Health & Human Services, Centers for Disease Control, and state/county public health departments.
- Minor disease outbreaks not typically covered by FEMA, Covid-19 was declared a national disaster and therefore some relief is available to various groups
 - Applications for funeral cost assistance for individuals/families
 - Covid-19 funding for state, local, tribal, & territorial governments can be applied for through FEMA Public Assistance Simplified Applications
 - Released March 2020
 - CARES act

Hazus county datasets

- The FEMA Hazus software statewide datasets currently use information from the 2010 Census
- Used by Hazus to model and assess risk of earthquakes and floods
- Hazus models can be run with the default data
 - level of detail included is up to each county, updated information can better predict the physical damage and economic losses of structures
 - not all fields are necessary to run models, but they can help planning partners create more informed

*Any planning partners interested in reviewing and updating county datasets will be sent the excel files, a data request sheet, and format explanations

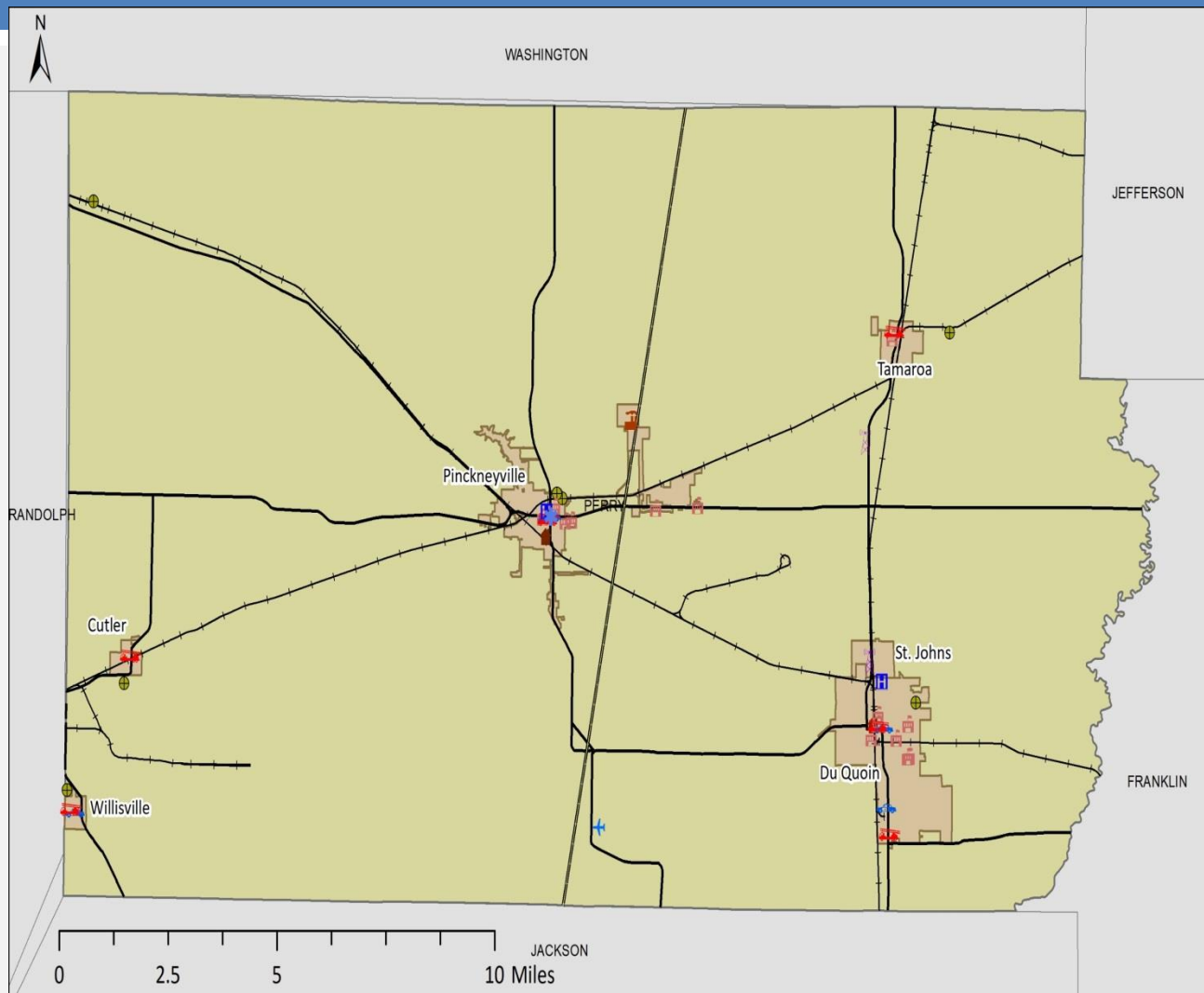
Essential & Critical Facilities

- Essential:

- Emergency Operations Center
 - (required by FEMA, usually designated space within a police or fire station)
- Police stations
- Fire stations
- Schools
- Healthcare facilities
 - Only major hospitals included by software, others can be manually added

- Critical:

- Transportation – Airports, highways, railways, and bridges
- Utilities – wastewater treatment, potable water storage, water/sewer lines, gas pipelines, power plants
- Communication – cell towers and warning sirens
- Dams – not included in county dataset, can be added manually
- User defined



- | | | | |
|-------------|------------------------|---------------|-----------------------|
| EOC | Fire Station | Airport | Natural gas pipeline |
| Hospital | Police Station | Train Station | Railroad |
| School | Wastewater Treatment | Highway | Municipality boundary |
| Power Plant | Communication Facility | | |

Request for photos

of the hazard itself and/or damage caused from the event

- Floods
- Tornados/derechos
- Hail and lightning
- Sinkholes
- Ice/snow storm
- Earthquakes
- Invasive species
- Relevant newspaper clippings

Include with photos:

Location and date

Name of photographer

Permission to include in
MHMPs published by Greater
Egypt

Send to:

kelseybowe@greateregyp
t.org



PERRY COUNTY MULTI-HAZARD MITIGATION PLAN



Conducting a Risk Assessment



What is a Risk Assessment?

“The process of assigning values to risks for purpose of prioritizing, developing and comparing courses of action, and informing decision making.” - FEMA

- Each jurisdiction is required to form their own risk assessment for each listed hazard.



The Importance of Assessing Risks

- Irons out what assets may be affected
- Creates the discussions about potential mitigation actions
- Allows for prioritizing risks



Steps to Assess Risks

1. Create a list of potential hazards/risks within your area.
2. Use the **risk index equation** to calculate a rank.
3. List the hazards in order from highest to lowest rank.



2015 MHMP List of Hazards

- | | |
|-------------------------------|-------------------|
| 1. Tornado | 5. Winter Storm |
| 2. Hazardous Material Release | 6. Flooding |
| 3. Earthquake | 7. Wildfire |
| 4. Severe Thunderstorm | 8. Ground Failure |



List of Historic Hazards

- Tornado
- Derecho
- Dam / Levee Failure
- Ground Failure
- Flooding
- Dam Failure
- Severe Thunderstorm/Hail

Storm

- Winter Storm
- Drought/Excessive Heat
- Hazardous Material Release
- Pest/Invasive Species



List of All Possible Hazards

- Dam Failure
- Extreme Heat
- Landslide
- Mine Subsidence
- Thunderstorm/Windstorm*
- Wildfire*
- Earthquake*
- Flooding*
- Levee Failure
- Sinkhole
- Terrorism
- Tornado*
- Winder storm/Ice storm*
- Hazardous Materials Event*
- Epidemic
- Volcanic Eruption
- Meteor Impact
- Infestation (non-native plants, animals, or insects that decrease the livelihood of human life)



***Are there any hazards that you do not see listed,
that you would like to list for your jurisdiction?***



Risk Priority Index Equation

$$\text{Risk Index} = \text{Probability} * \text{Severity}$$

- The **Probability** of an event is how likely the event will occur.
- The **Severity** of the event is the degree to which a hazard affects the functionality of society and the natural environment.

Rating the Probability of a Hazard

Probability	Characteristics
4 – Highly Likely	<p>Event is probable within the next calendar year.</p> <p>These events have occurred, on average, once every 1-2 years in the past.</p>
3 – Likely	<p>Event is probable within the next 10 years.</p> <p>Event has a 10-15% chance of occurring in any given year.</p> <p>These events have occurred, on average, once every 3-10 years in the past.</p>
2 – Possible	<p>Event is probable within the next 50 years.</p> <p>Event has a 2-10% chance of occurring in any given year.</p> <p>These events have occurred, on average, once every 10-50 years in the past.</p>
1 – Unlikely	<p>Event is probable within the next 200 years.</p> <p>Event has a 0.5-2% chance of occurring in any given year.</p> <p>These events have occurred, on average, once every 50-200 years in the past.</p>

Rating the Severity of a Hazard

Severity	Characteristics
8 – Catastrophic	Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50% of property is severely damaged.
4 – Critical	Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least 14 days. More than 25% of property is severely damaged.
2 – Limited	Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than seven days. More than 10% of property is severely damaged.
1 – Negligible	Injuries and/or illnesses are treatable with first aid. Minor quality of life lost. Shutdown of critical facilities and services for 24 hours or less. Less than 10% of property is severely damaged.

Complete the Hazard Ranking Exercise

1. Form the hazards lists.
 - Be sure to list ALL possible hazards.
2. Give each hazard a probability and a severity rating.
3. Calculate the risk rank using the risk index equation.
 - Some hazards will have the same ranking.
4. Re-list your hazards from highest to lowest rankings.