

JEFFERSON COUNTY MULTI-HAZARD MITIGATION PLAN





Meeting 1 June 22, 2021 10:00 AM





Welcome and Introductions

Steve Lueker, EMA Coordinator – Jefferson County EMA

Cary Minnis, Executive Director - Greater Egypt



Agenda

1. Welcome and Introductions Steve Lueker, EMA Coordinator – Jefferson County EMA

2. Multi-Hazard Mitigation Planning Process Tyler Carpenter, Environmental Planning Director, Greater Egypt

3. Responsibilities of Planning Partners

- 4. Jefferson 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

Jefferson County MHMP 2021



Zoom Meeting Notes

- Meeting Recording 1.
- Mute/Unmute 2.
- Video On/Off 3.
- Chat Box 4.
- Polls 5.

6.





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



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



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



HMGP – Hazard Mitigation Grant Program

Reed Station MHP Acquisition

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







HMGP – Hazard Mitigation Grant Program

West Frankfort Wastewater Treatment Plant Relocation

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







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 Jefferson 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 Jefferson 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

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Planning Timeline

Mitigation Planning	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Timeline	1	2	3	4	5	6	7	8	9	10	11	12	13
Meetings: Goals and Objectives													
Meetings: Public involvement													
Meetings: Mitigation Activities													
Write Plan													
Review Plan													
Finalize Plan													
Print Plan													
State/ Federal Review													

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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



JEFFERSON COUNTY MULTI-HAZARD MITIGATION PLAN



Historical, current, and potential hazards List of critical facilities to be reviewed and updated





FEMA definitions

- <u>Hazard Extent</u>: 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.
- <u>Hazard Impacts</u>: 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

 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+ mpCrechos
- 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

Enhance	3-	Selected Degrees of Damage					
d Fujita Number	Second Gust Speed (mph)	Descriptions					
0 Gale	65-85	Loss of <20% roofing material, loss of siding. Loss of rooftop HVAC.					
1 Moderat e	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 Significa nt	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 Devastat ing	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 Incredibl e	Over 200	Total destruction of residential houses, destruction of large buildings such as shopping malls. Significant damage to					

DI	Damage Indicator							
Number								
1	Small Barns or Farm Outbuildings (SBO)							
2	One- or Two-Family Residences (FR12)	Nation	al Weather Service	DIs				
3	Manufactured Home – Single Wide (MHSW)	and a	n example Degree o	of				
4	Manufactured Home – Double Wide (MHDW)	Dama	no scalo					
5	Apartments, Condos, Townhouses [3 stories or less	– Dama 17	ye scale					
6	Motel (M)		Table 4					
7	Masonry Apartment or Motel Building (MAM)		14010 4.					
8	Small Retail Building [Fast Food Restaurants] (SF		One- and Two-Family Res	idences (FR12)			
9	Small Professional Building [Doctor's Office, Bra	Trucial Ca						
10	Strip Mall (SM)	I ypical Coi	istruction Asphalt shingles tile slate or metal roof o	verino				
11	Large Shopping Mall (LSM)	• 1	Flat, gable, hip, mansard or mono-sloped r	oof or con	nbinatic	ons the		
12	Large, Isolated Retail Building [K-Mart, Wal-Mar	 Plywood/OSB or wood plank roof deck 						
13	Automobile Showroom (ASR)	 Prefabricated wood trusses or wood joist and rafter construction 						
14	Automobile Service Building (ASB)		Brick veneer, wood panels, stucco, EIFS, v	myl or m	etal sidi	ng		
15	Elementary School [Single Story; Interior or Exte	 wood or metal stud walls, concrete blocks or insulating-concrete p Attached single or double garage 						
16	Junior or Senior High School (JHSH)		interior surgio of the next Barries					
17	Low-Rise Building [1-4 Stories] (LRB)	DOD*	Damage description	EXP	LB	UB		
18	Mid-Rise Building [5-20 Stories] (MRB)	1	Threshold of visible damage	65	53	8		
19	High-Rise Building [More than 20 Stories] (HRB)	2	Loss of roof covering material (<20%), gutters and/or awning; loss of vinyl or metal siding	79	63	9		
20	Institutional Building [Hospital Government or	3	Broken glass in doors and windows	96	79	11		
20		7	material (>20%); collapse of chimney; garage doors	8	=1.000	690		
24	(ID)	5	collapse inward or outward; failure of porch or carpor	97	81	11		
21	Ivietal Building System (IVIBS)	6	Large sections of roof structure removed; most walls	121	105	14		
22	Service Station Canopy (SSC)	8	remain standing	122	104	14		
23	Warehouse Building [Tilt-up Walls or Heavy-Tim	/	Top floor exterior walls collapsed	132	113	12		
	Construction1(WHB)	9	Most walls collapsed in bottom floor, except small	140	128	1/		
24	Transmission Line Towers (TLT)		interior rooms	152	127	17		
24		10	1 otal destruction of entire building	1/0	142	19		

Tri State Tornado: March 18, 1925

THE SOUTHERN ILLINOISAN SUNDAY, MARCH 18, 2012

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

- Missouri, Illinois, Indiana
- Path length of 219miles and width of 3/4mile
- 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 tornados that caused death, injury, or property damage in Jefferson County IL. Source:

Location	Date	Rating	Deaths	Injuries	F	Property Damage
	12/18/1	957 F4		1 4	45	2500000
	12/18/1	957 F2		0	2	25000
	12/18/1	957 F2		0	0	25000
	12/19/1	957 F2		0	0	25000
	5/9/1	959 F1		0	0	25000
	2/9/1	960 F2		0	1	250000
	4/20/1	966 F0		0	0	25000
	5/7/1	973F1		0	3	0
	3/30/1	982F2		1	3	2500000
	5/1/1	983 F1		0	0	2500000
INA	4/19/1	996 F3		0	0	200000
CRAVAT	4/15/1	998F2		0	1	400000
BLUFORD	4/21/2	002F1		0	0	2000
WOODLAWN	5/30/2	004F1		0	0	100000
MT VERNON	6/27/2	008EF0		0	0	5000
TEXICO	3/8/2	009EF1		0	0	60000
STRATTON	3/8/2	009EF0		0	0	12000
SHIRLEY	6/27/2	010EF0		0	0	2000
BLUFORD	4/19/2	011EF1		0	0	90000
MT VERNON	4/19/2	011EF1		0	0	70000
WOODLAWN	5/25/2	011EF2		0	0	4000000
SHIRLEY	3/23/2	012EF2		1	2	150000
OPDYKE	11/17/2	013EF1		0	0	3000
BLUFORD	10/13/2	014EF1		0	0	50000
DIX	10/13/2	014EF1		0	0	10000
BELLE RIVE	3/19/2	020 E E 0		0	0	3000

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 120mh 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 26.2009

Hazard Risk

- All of Jefferson 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





USGS long term earthquake risk model (2018)

https://www.youtube.com/watc h?v=b_alm5oi5eA

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.)

Earthquake Waves



Historic Earthquakes in **J**efferson County: Mag 2.7 2/26/1986 Mag 3.0 10/29/1986 Mag 2.8 3/15/1988 Mag 3.2 10/24/1990 Mag 2.9 9/5/1995

Data Sources: USGS earthquake catalog, USGS 2008 pational

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 7 of 8 Madrid Earthquake (Washington, DC: US Department of the Interior, 1912)]

Missouriencyclopedia.org

Risk

- Earthquakes could occur anywhere in Jefferson County
- Severe earthquakes (magnitude 7 or higher) within the New Madrid or Wabash Velley 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
 - Most coal mines in Jefferson County are underground "room and pillar" mines
- 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



Ine 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 back yard 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 occured 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, occured in

Some subsidence claims fall through gaping loophole

By Pete Rosenbery 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 Carterville 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 oversees 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
Historical ground failure

No national or state database for minerelated sinkholes

Data below compiled from local newspaper archives

County	Municipali ty	Year	# of subsidence events	Type of subsidence	Diamter	Depth
Perry	Du Quoin	1954	. 1	Mine	50ft	
Franklin	Zeigler	1970	1	Mine	no visible hole formed	NA
Williams on	Energy	1979	2	Mine		
Willams on	Energy	1981	1	Mine	100ft	
Williams on	Energy	1981	1	Mine	25ft	50ft
Williams on	Energy	1981	1	Mine	25ft	15ft
Franklin	Sesser	1986	1	Mine	5ft	27ft
Jackson	Dowell	1986	1	Mine		
Williams on	Energy	1992	1	Mine	20ft	12ft
Union	Dongola	1993	3	Karst	10ft,10ft,	6ft, 6ft, 50ft
Williams on	Cambria	1996	1	Mine	22 by 12 ft	81ft
Williams on	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 yout 8 feet across and 14 feet deep. y of the City of Du Quoin/Facebook

R. Trappe, Benton News 2.29.2020

Risk

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



4. Floods

<u>Flash Flood</u>: rapid flooding of upstream tributaries and/or urban areas when drainage systems become overwhelmed <u>Riverine Flood</u>: widespread, long lasting flood conditions of major rivers

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



In June, the Chester Bridge and Highway 51 disappear into the Mississippi River approaching McBride, Missouri. Courtesy of Joggerst Aerial Photography/Used with permission

By JERRY NOWICKI Capitol News Illinois Jnowicki@capitolnewsillinois.com updated: 7/17/2019 11:52 AM

- 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 nower/services changes in hydrology and



100 year floodplain and dam locations for Jefferson 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



				Hazard	
			Year	Potenti	
Dam Name	River	Municipality	built	al	EAP
CONSOL/REND LAKE			4000		.,
MINE/SLURRY CELL 2 DAM	IRIB REND LAKE	SESSER	1998	н	Y
CONSOL/REND LAKE					
MINE/SLURRY			4000		.,
IMPOUNDMENT 1	TRIB REND LAKE	EWING	1993	Н	Y
		MOUNT			
L & N RESERVOIR	TRIB CASEY FORK	VERNON	1910	Н	Y
		MOUNT			
MILLER LAKE DAM	TRIB CASEY FORK	VERNON	1947	Н	Y
FREEMAN/ /EAST LAKE				_	
DAM	TRIB BUCK CREEK	WALTONVILLE	1961	S	N
HAWTHORNE HILLS LAKE				_	
DAM	TRIB CASEY FORK	PLUMFIELD	1969	S	N
ILLINOIS CENTRAL				_	
RESERVOIR DAM	FOURMILE CREEK	MILL SHOATS	1926	S	N
		MOUNT			
LAKE JAYCEE DAM	TRIB CASEY FORK	VERNON	1905	S	Y
RAW WATER RESERVOIR					
DAM	WARD BRANCH	PLUMFIELD	1966	S	N
SPRINGFIELD COAL/ORIENT					
6 /SOUTH SLURRY CELL	TRIB EAST HURRICANE				
DAM	CREEK	WALTONVILLE	1985	S	Y
SWAN LAKE DAM	TRIB RAYSE CREEK		1971	S	N
WALTONVILLE LAKE DAM	TRIB BUCK CREEK	WALTONVILLE	1910	S	N
		MURPHYSBOR			
BUSHONG POND DAM 1*	TR- BIG MUDDY RIVER	0	1977	L	NR
CONSOL/REND LAKE					
MINE/SEDIMENT POND			1000		
009 DAM	TRIB SILVER CREEK	SESSER	1999	L	Y
CONSOL/REND LAKE/SED					
POND 008 DAM	TRIB MOREDOCK LAKE	BENTON	1995	L	N
DONOHO POND DAM 1	TR- LICK BRANCH	WAYNE CITY	1979	L	NR
E POND TREATMENT		SESSER		L	N
FREEMAN UNITED/ /2					
PORTAL LAKE	TRIB LITTLE MUDDY RIVER	DESOTO	1974	L	N
LAGG LAKE 1 DAM	TRIB CASEY CREEK	IDLEWOOD	1976	L	N
LAGG LAKE 2	TRIB CASEY FORK	IDLEWOOD	1976	L	N
		MOUNT			
LAKE NORMANDY DAM	TRIB LIMESTONE CREEK	VERNON	1969	L	N
LEWIS INDUSTRIAL PARK					

No recorded incidents for Jefferson County dams The national average age of dams in the US is 57 years, the average age in Jefferson County is 50 years

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

* Starred dams are not regulated nor inspected by Illinois Department of Natural Resources (IDNR)

Flood Records 1996-2021

Flood Events in Jefferson county Source: NOAA Storm Events Database

			Property	
Location	Date	Deaths	Damage	
	3/1/1997	0	20000	
MT				
VERNON	7/14/1997	0	5000	
	1/21/1999	0	0	
	4/4/1999	0	0	
DIX	3/18/2008	2	58000	
BAKERVIL				
LE	4/24/2011	0	0	
SPRING				
GARDEN	5/1/2011	0	30000	
DIX	7/2/2013	0	10000	
WALTONVI				
LLE	8/15/2016	0	0	
WALTONVI				
LLE	5/21/2019	0	0	
MT				
VERNON	5/29/2019	0	0	

Flash flood events in Jefferson county that caused injury or property damage Source: NOAA Storm Events Database

			Property
Location	Date	Injuries	Damage
MT	4/28/19		
VERNON	96	0	20000
COUNTY	3/12/20		
WIDE	06	0	30000
	4/19/20		
SHIRLEY	09	0	10000
	9/8/201		
DIX	8	1	400000

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:
 - Big Muddy river
 - Rayse creek
 - Casey Fork
 - Horse 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





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 flooding

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.

NOAA IL state climate summery, J. Salter The Southern Illinoisian Apr 15, 2020, G. Ambrose Quad City Times Mar 5.2020

Flood relief options

- National Flood Insurance Program
 - Managed by FEMA
 - Participating communities must adopt and Mount enforce floodplain management plans to be Vernon eligible
 - Required for homes and businesses in high risk areas, others in moderate to low risk may purchase flood insurance
 BI BI BI BI Di
- 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 narticinate in Municipali participati ty on? ves Belle Rive no Bluford no Bonnie yes Dix no Ina yes Nason yes Waltonvill е no Woodlaw no n

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

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

Observed Number of Extreme Precipitation Events



NOAA State Climate Summaries: Illinois

Historic Records 1950-preser

- 126 total records of thunderstorm winds, 1 death, 6 injuries, 79 property damage records
- 85 total records of hail, 3 of which caused property damage, 1 record of crop damage
- 3 records of lightening causing property damage



HAIL, HAIL

Neb., holds an ice cube at right is visiting her grandparents, Dr. and a hailstone at left. The and Mrs. H. W. Patterson, 105 hail fell in Carbondale during N. University, Carbondale.

Helen Hughes of Omaha, an electrical storm Monday. She

Cooler In Area

Hail Damages Apple Crop As Rain, Lightning Strike

Hail hitting orchards south of an oil tank flare, starting a Murphysboro and Carbondale grass fire at 400 S. Locust St., damaged apples during a bril- 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

Urban Heat Islands



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

- 1-7 degrees hotter than surrounding natural areas
- Increased air pollution
- Higher risk of heatrelated 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

2019

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,



Student projects shape healthier future for Southern Illinois University's lake

GABRIEL NEELY-STREIT The Southern

ARBONDALE – In sickness and in health, Southern Illinois University's Campus Lake brings people together.



Historic Records

- 19 drought records (1998-2012)
 - One drought in 2007 caused \$3.45 million in crop damage
- 10 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, 5-9miles above the

polar vortex



February 16, 2021 Carbondale IL



Historic records 1996-present

Date	Weather Event	Property Damage	
3/3/2008	Winter Storm		50000
2/24/2016	Winter Storm		30000

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

winter weather events in Jefferson county that leadsed property damage source: NOAA storm events database

Millions left without power as massive winter storm slams US

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

blast of winter weather the system as record-setting. across the U.S. plunged Texas into an unusually icy emergency Monday that for a typical, or even an ex-1 1 1 1

Electric Reliability Council of Texas. He defended preparations made by grid operators AUSTIN, Texas - A frigid and described the demand on "This event was well bevond the design parameters



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 explosion was intentional though sleep miles away, authorities said. a criminal investigation is under-

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

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, ac-



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 Planning

					cal Quality
Facility Name	Address	City	Contact Person	Chemical Name	(lbs.)
CONTINENTAL GENERAL TIRE		MOUNT	HENRY	ZINC	
INC.	11525 N IL HWY. 142	VERNON	EISENGA	COMPOUNDS	7
CONTINENTAL GENERAL TIRE		MOUNT	HENRY		
INC.	11525 N IL HWY. 142	VERNON	EISENGA	N-HEXANE	4
CONTINENTAL GENERAL TIRE		MOUNT	HENRY	COBALT	
INC.	11525 N IL HWY. 142	VERNON	EISENGA	COMPOUNDS	4
		MOUNT	MATTHEW F.		
JOY MINING MACHINERY	4 INDUSTRIAL PARK	VERNON	HALEY	MANGANESE	3

Chemi

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)



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 WINKELER The Southern

By Phil Brinkman Of The Southern Illinoisan

Zebra mussels, the prolific, fingernailstred mollusks whose North American debut in the Great Lakes five years ago alarmed marine biologists, likely have taken up tesidence 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 musU.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 exercise to absorb to the second to the second terms of the second to the second to the second to the second terms of the second to the second to the second terms of terms o

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.

Zebra mussels invade regi

"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 Mediferranean 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 sur rounding water.

Moreover, because they do not move once they are attached to something, the Id 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 1the sewage effluent. Sheehan said, they are 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

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'**

75

n:

ADRIANA BRASILEIRO The Miami Herald

MIAMI - South Florida ap-

Right: Southern Illinoisian Mar 29

2020

Bottom: southern Illinoisian Feb 14

SIU² 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 Ults-cound famale

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, researchsouthern Illinois University Carbondale graduate student Hudman Evans rs, including graduate student stands with what is believed to be the largest specimen of the invasive Hudman Evans, who is writing his 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 asses risk of earthquakes and floods
- Hazus models can be ran 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 belo 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



Essential & critical facilities in Jefferson County, IL

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@greateregypt.or g



JEFFERSON 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.

Jefferson County MHMP 2021



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
- 2. Hazardous Materials Release
- 3. Earthquakes
- 4. Flooding

- 5. Pandemic/Epidemic
- 6. Severe Thunderstorm
- 7. Winter Storm
ZUZI



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

ZUZI



List of All Possible Hazards

- Dam Failure
- Extreme Heat
- Landslide
- Mine Subsidence
- Thunderstorm/Windstorm
- Wildfire
- Earthquake
- Flooding
- Levee Failure
- Sinkhole

- Terrorism
- Tornado
- Winder storm/lce storm
- Hazardous Materials Event
- Epidemic
- Volcanic Eruption
- Meteor Impact
- Infestation (non-native plants, animals, or insects that decrease the livelihood of human life)



ZUZ

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



Risk Priority Index Equation

Risk Index = Probability x 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	Event is probable within the next calendar year.
	These events have occurred, on average, once every 1-2 years in
	the past.
	Event is probable within the next 10 years.
	Event has a 10-15% chance of occurring in any given year.
J - LIKEIY	These events have occurred, on average, once every 3-10 years in
	the past.
2 – Possible	Event is probable within the next 50 years.
	Event has a 2-10% chance of occurring in any given year.
	These events have occurred, on average, once every 10-50 years in
	the past.
1 – Unlikely	Event is probable within the next 200 years.
	Event has a 0.5-2% chance of occurring in any given year.
	These events have occurred, on average, once every 50-200 years
	in the past.

ZUZ



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 in 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.

ZUZI



Hazard Ranking Exercise



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.

Use the table below to give each hazard a probability and severity ranking. Then, use the above equation to complete the hazard risk assessment by giving each hazard a risk index. Use the risk index of each hazard to then rank each hazard by most threatening/important to least threatening/importance.

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

Severity	Characteristics		
	Multiple deaths.		
8 – Catastrophic	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 in 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.		

a star	Hazard	Probability (1-4)	Severity (1,2,4, or 8)	Risk Index (P*I)	Rank
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97-9351 ext.				15	
Thank you.					
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