

Polk County Hazard Mitigation Plan Update Meeting #2

February 28, 2018
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Southwest Missouri Council of Governments



Southwest Missouri
Council of Governments

Outline

- ▶ Participation overview
- ▶ Process recap
- ▶ Risk assessment
- ▶ Mitigation strategies preview
- ▶ Future meeting dates

Local Plan Participation

- ▶ Attend a minimum of two Mitigation Planning Committee meetings
- ▶ Documentation of Time and Effort
- ▶ Adoption of the Hazard Mitigation Plan
- ▶ Complete Capabilities Survey
 - ▶ Current Plans
 - ▶ Additional Questions
 - ▶ Provide Insured Replacement Cost for Structures and Contents

Time & Effort Reporting

- ▶ Hourly rate for volunteer time in Missouri:
 - ▶ \$21.57
- ▶ Federal mileage rate
 - ▶ 54¢ per mile

9 Tasks in the Planning Process

- ▶ Task 1: Determine the Planning Area and Resources → Completed
- ▶ Task 2: Build the Planning Team- Completed → YOU ARE THE TEAM!
- ▶ Task 3: Create an Outreach Strategy→ December 13th
- ▶ Task 4: Review Community Capabilities→ Questionnaire - any questions?
- ▶ Task 5: Conduct a Risk Assessment → Today
- ▶ Task 6: Develop a Mitigation Strategy→ Meeting #3
- ▶ Task 7: Review and Adopt the Plan → Meeting #4 and on your own
- ▶ Task 8: Keep the Plan Current → That's YOU!
- ▶ Task 9: Create a Safe and Resilient Community→ That's YOU!

Risk Assessment

- ▶ Is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazard events by assessing the vulnerability of people, buildings, and infrastructure to natural hazards
- ▶ Evaluates the degree to which injuries and damages may occur
- ▶ Provides the foundation for the rest of the mitigation planning process

Hazard Identification and Vulnerability

- ▶ Code of Federal Regulations Title 44 Emergency Management and Assistance Part §201.6

- ❖ (c) Plan content. The plan shall include the following:

- ☐ (i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction
- ☐ The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events
- ☐ (ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section; **This description shall include an overall summary of each hazard and its impact on the community**

Presidential Disaster Declarations 1990-Present (14)

Disaster Number	Description	Declaration Date	Individual Assistance (IA) Public Assistance (PA)
4250	Severe Storms, Tornadoes, Straight-line Winds, Flooding	January 21, 2016	Individual Assistance
4238	Severe Storms, Tornadoes, Straight-line Winds, Flooding	August 7, 2015	Public Assistance
1980	Severe Storms, Tornadoes, Flooding	May 9, 2011	Public Assistance
1961	Severe Winter Storm, Snowstorm	March 23, 2011	Public Assistance
1847	Severe Storms, Tornadoes, Flooding	June 19, 2009	Individual & Public Assistance
1773	Severe Storms, Flooding	June 25, 2008	Public Assistance
1749	Severe Storms, Flooding	March 19, 2008	Public Assistance
1728	Severe Storms, Flooding	September 21, 2007	Public Assistance
1676	Severe Winter Storms, Flooding	January 15, 2007	Public Assistance
1524	Severe Storms, Tornadoes, Flooding	June 11, 2004	Individual Assistance
1463	Severe Storms, Tornadoes, Flooding	May 6, 2003	Individual & Public Assistance
1412	Severe Storms, Tornadoes	May 6, 2002	Individual & Public Assistance
1253	Severe Storms, Tornadoes, Flooding	October 14, 1998	Public Assistance
995	Severe Storms, Flooding	July 9, 1993	Individual & Public Assistance

Hazards Identified

- ▶ Dam Failure
- ▶ Drought
- ▶ Earthquake
- ▶ Extreme Heat
- ▶ Fires
- ▶ Flooding: Riverine and Flash
- ▶ Severe Thunderstorms
- ▶ Tornadoes
- ▶ Severe Winter Weather
- ▶ Levee Failure - **Omitted**

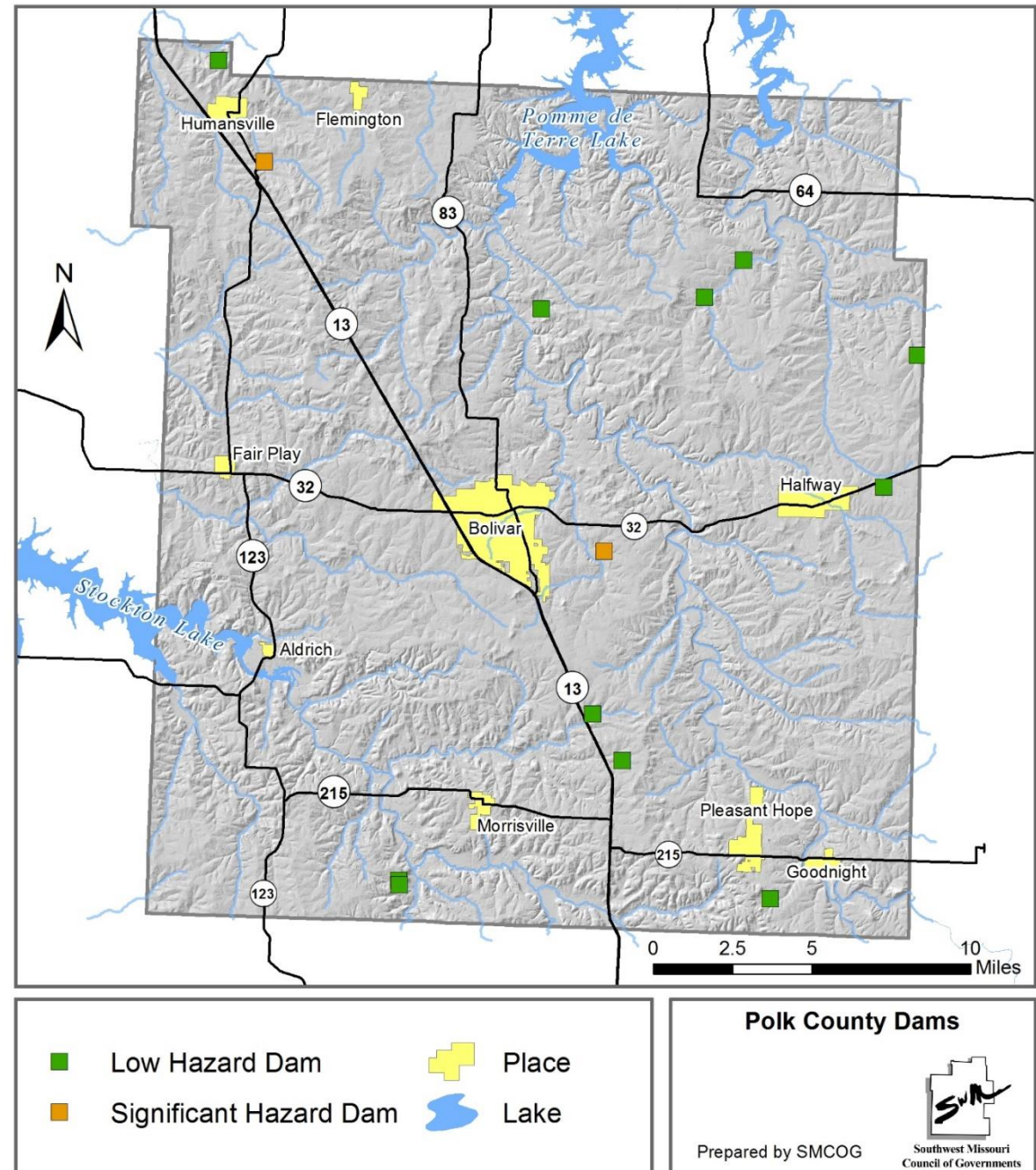
Identified Hazard: Dam Failure

MDNR Dam Hazard Classification Definitions	
Hazard Class	Definition
Class I	The area downstream from the dam that would be affected by inundation contains ten (10) or more permanent dwellings or any public building. Inspection of these dams must occur every two years
Class II	The area downstream from the dam that would be affected by inundation contains one to nine permanent dwelling, or one (1) or more campgrounds with permanent water, sewer and electrical services or one (1) or more industrial buildings. Inspection of these dams must occur once every three years.
Class III	The area downstream from the dam that would be affected by inundation does not contain any of the structures identified for Class I or Class II dams. Inspection of these dams must occur once every five years

National Inventory of Dams Hazard Classification Definitions	
Hazard Class	Definition
Low Hazard	Failure results in only minimal property damage.
Significant Hazard	Failure could possibly result in the loss of life and appreciable property damage.
High Hazard	If the dam were to fail, lives would be lost and extensive property damage could result.

There is not a direct correlation between the State Hazard classification and the NID classifications. However, most dams that are in the State's Classes I and II are considered NID High Hazard Dams.

- ▶ 13 NID dam in Polk County
 - ▶ 2 Significant Hazard
 - ▶ 11 Low Hazard



Past Occurrences

- ▶ No previously recorded dam failure
- ▶ Dam failure rare in Polk County; probability difficult to determine
- ▶ Potential impact from other dams, but advanced warning would result in low impact.

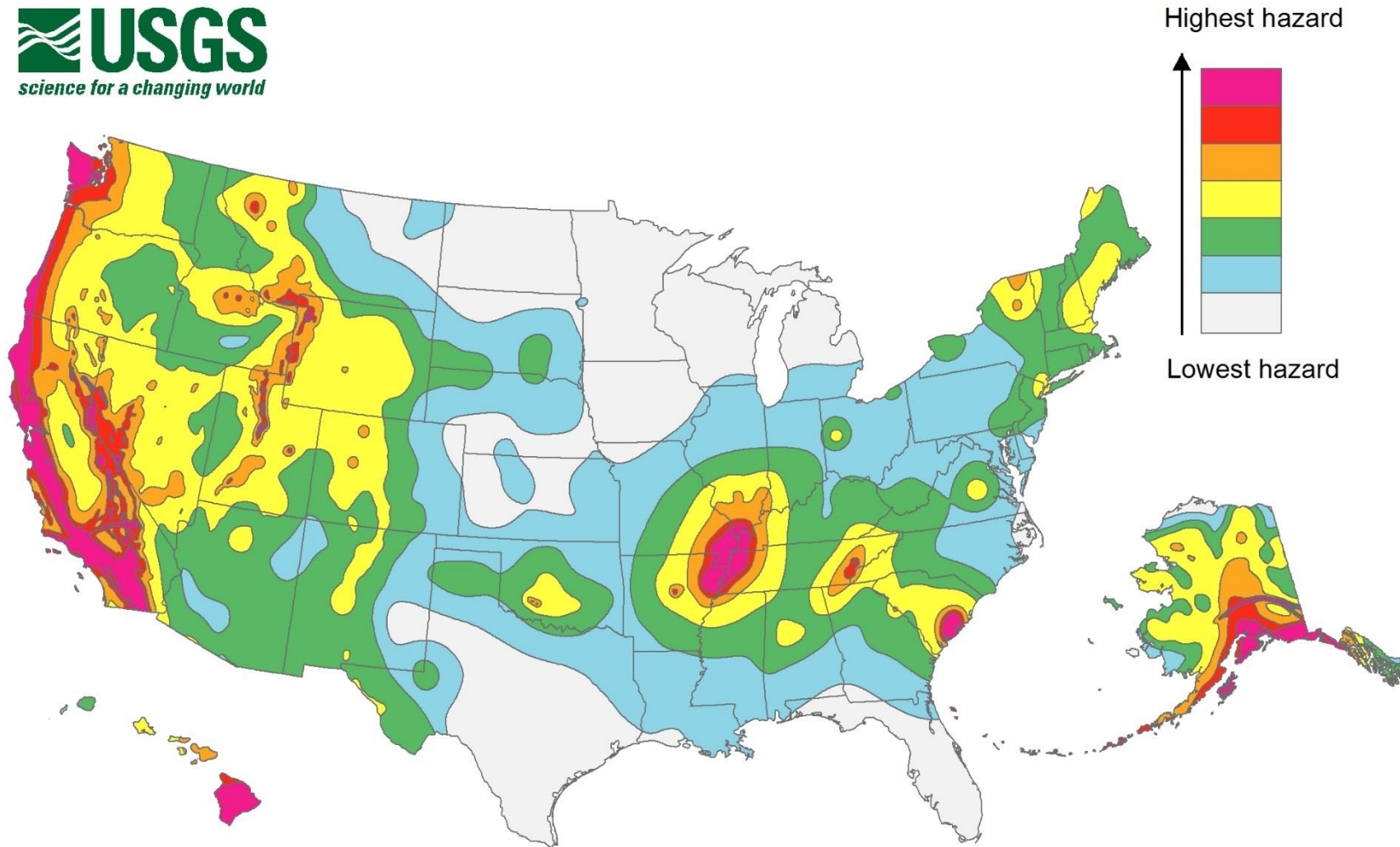
Identified Hazard: Drought

- ▶ **Meteorological Drought:** Regionally based; in the United States, indicated by less than 2.5 mm of rainfall in 48 hours, which is the first indication of drought
- ▶ **Agricultural Drought:** Soil moisture cannot meet the demands of a crop; after a meteorological drought but before a hydrological drought
- ▶ **Hydrological Drought:** Reduction in surface and subsurface water supplies; measured through stream flow and lake, reservoir, and ground water levels
- ▶ **Socioeconomic Drought:** Water shortages affect people, either in terms of water supply or economic impacts (i.e. loss of crops so price increases)

Past Occurrences

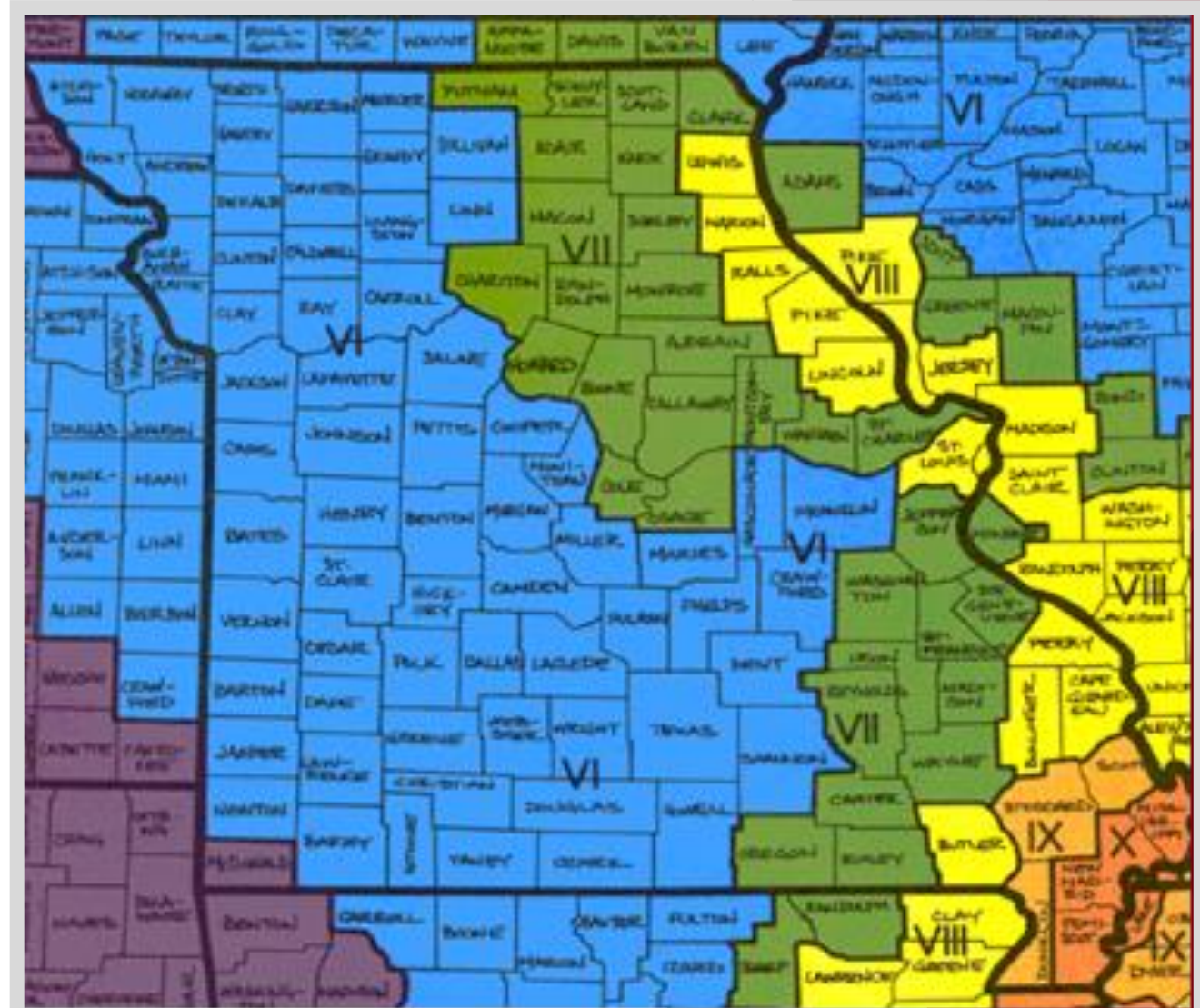
- ▶ 13 events from 1998-2017
 - ▶ 3 events resulted in damages
 - ▶ 1999 - \$20,000 crop damage
 - ▶ 2012 - \$600,000 property damage
 - ▶ 2012 - \$17,030,000 crop damage
 - ▶ 10% probability of a damaging event in any given year; average losses of \$5,883,333 in crop damages per damaging event

Identified Hazard: Earthquake

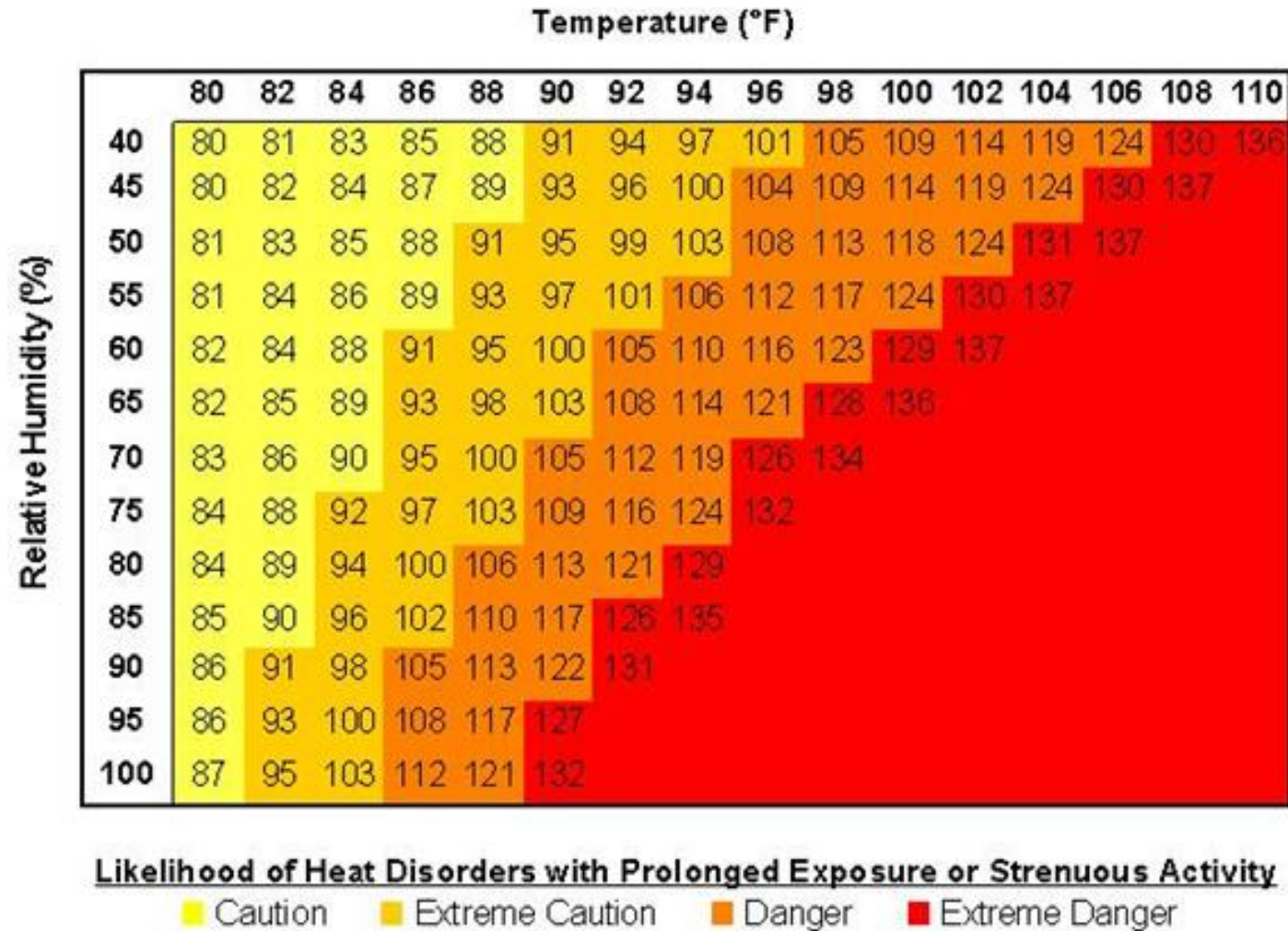


Identified Hazard: Earthquake

- ▶ Modified Mercalli Scale Based on a 7.6 Magnitude Earthquake along the New Madrid Fault
- ▶ Zone VI
 - ▶ Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster; damage slight.
- ▶ Past Occurrences: No recorded significant earthquakes in Polk County



Identified Hazard: Extreme Heat

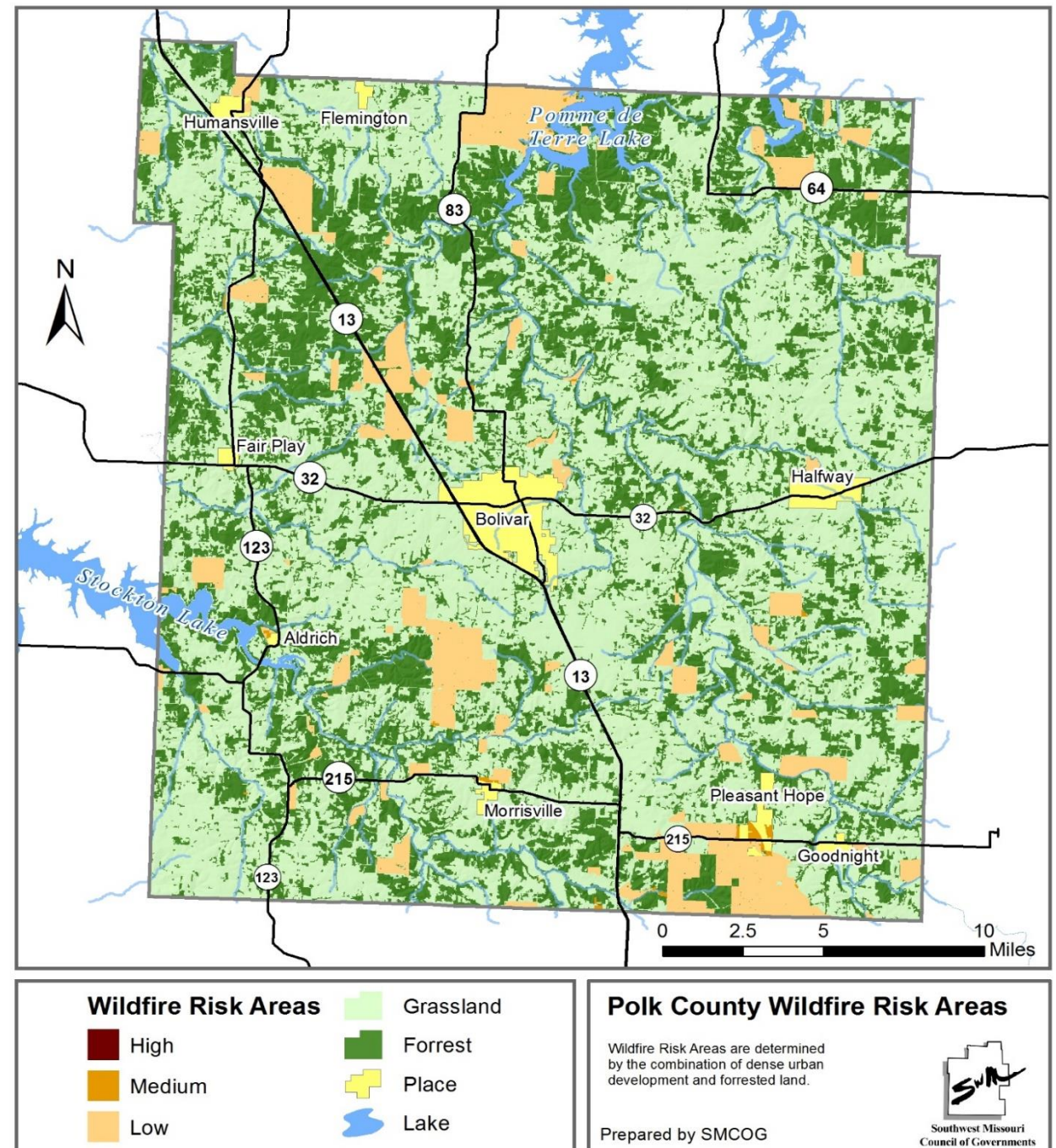


Past Occurrences

- ▶ 9 events from 1998-2017; 4 years with events
- ▶ No reported injuries, deaths, or damages
- ▶ 20% probability of extreme heat event in any given year
- ▶ 06/01/2012 - 08/31/2012 - Almost entire summer was under heat advisory. Mean temperature in July 6.1 degrees above normal; 12 days consecutively over 100 degrees.

Identified Hazard: Wildfire

- ▶ Areas that abut wildland vegetation and that intermingle with wildland are most at risk for wildfire
- ▶ All communities have or are near wildfire prone areas
- ▶ Large areas of low risk
- ▶ Few areas of medium risk
- ▶ No areas of high risk



Past Occurrences

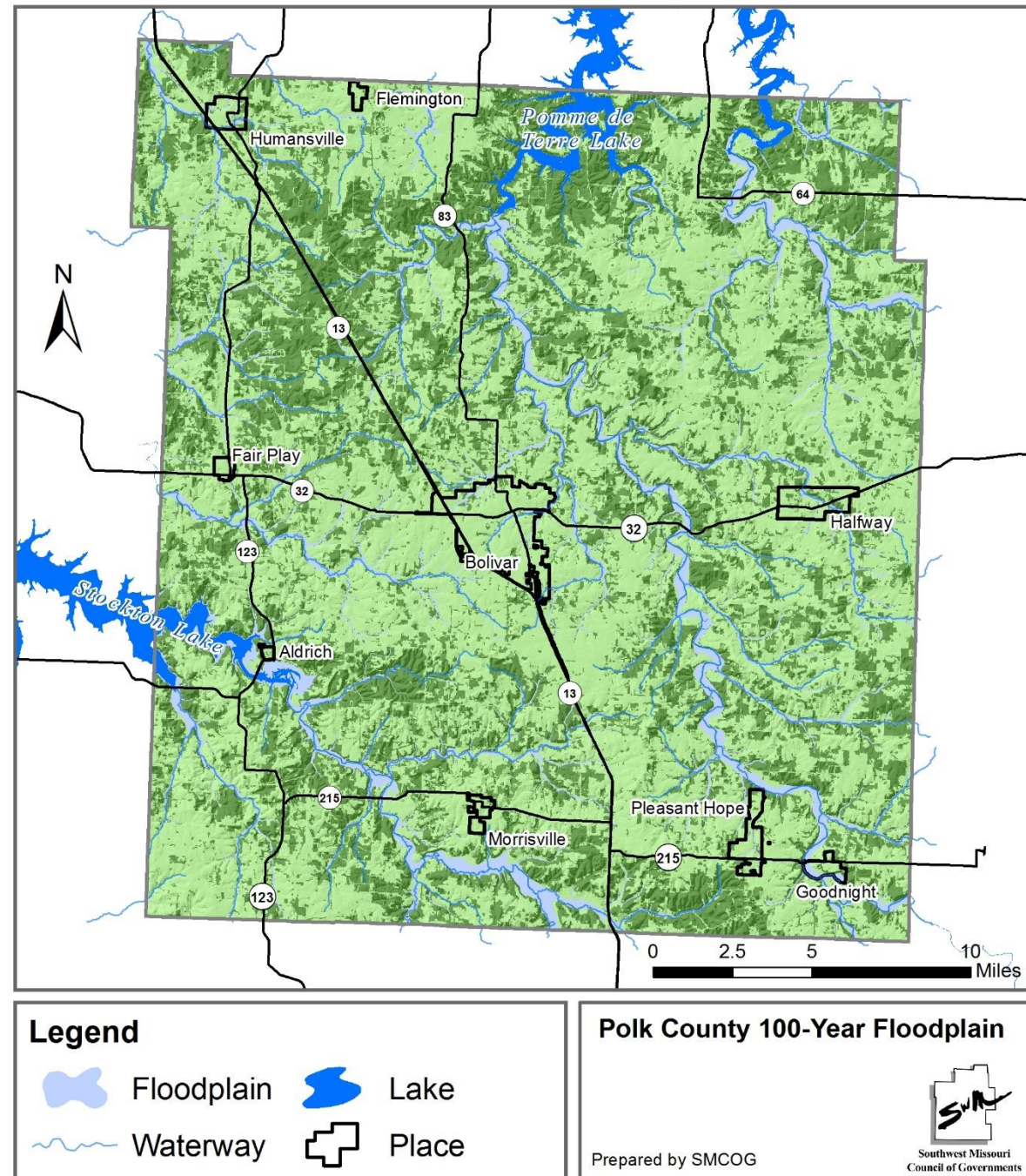
▶ NOAA/NCEI

- ▶ 3 events from 1998-2017
 - ▶ 2 damaging events resulted in \$75,000 in property losses
 - ▶ 10% probability of a damaging event
 - ▶ \$37,500 average loss per damaging event

▶ MDC Fire Reporting

- ▶ 654 events from 2008-2017
 - ▶ 14,034.56 acres burned
 - ▶ 45 buildings destroyed
 - ▶ 41 buildings damaged
 - ▶ 725 buildings threatened

Identified Hazard: Riverine and Flash Flood



Past Occurrences

▶ **Riverine Flood** - 35 recorded events from 1998-2017

- ▶ 3 damaging events resulting in \$535,000 in property damage; 2 years with damaging events
- ▶ 10% probability of a damaging event in any given year with average losses of \$178,333

▶ **Flash Flood** - 106 events from 1998-2017

- ▶ 14 events resulting \$10,840,000 in damages; 8 years with damaging events
- ▶ 40% probability of a damaging event in any given year with average losses of \$774,286 per damaging event

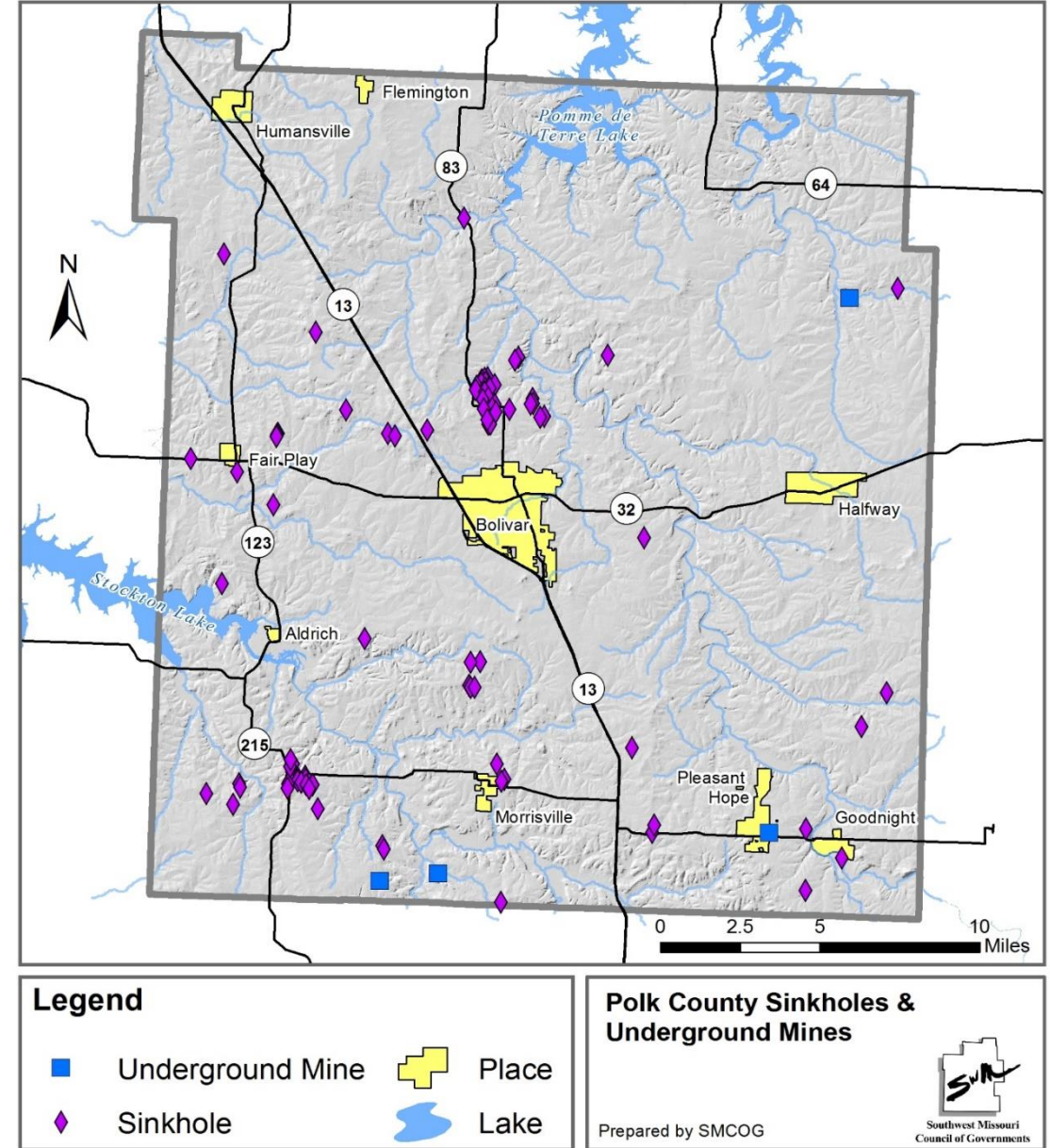
Past Occurrences

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2002	2	0	0	\$525,000	\$0
2005	2	0	0	\$0	\$0
2007	2	0	0	\$0	\$0
2008	2	0	0	\$0	\$0
2009	4	0	0	\$0	\$0
2010	6	0	0	\$0	\$0
2011	8	0	0	\$0	\$0
2013	1	0	0	\$0	\$0
2015	5	0	0	\$0	\$0
2016	1	0	0	\$0	\$0
2017	2	0	0	\$10,000	\$0
Total	35	0	0	\$535,000	\$0

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1998	2	0	0	\$450,000	\$0
1999	1	0	0	\$0	\$0
2000	2	0	0	\$0	\$0
2001	5	0	0	\$0	\$0
2002	1	0	0	\$0	\$0
2004	1	0	0	\$0	\$0
2005	5	0	0	\$50,000	\$0
2007	12	0	1	\$9,010,000	\$0
2008	16	0	0	\$230,000	\$0
2009	4	0	0	\$0	\$0
2010	12	0	0	\$0	\$0
2011	9	0	0	\$250,000	\$0
2012	1	0	0	\$0	\$0
2013	8	0	0	\$0	\$0
2014	2	0	0	\$50,000	\$0
2015	14	1	0	\$700,000	\$0
2016	5	0	0	\$0	\$0
2017	6	0	0	\$100,000	\$0
Total	106	1	1	\$10,840,000	\$0

Identified Hazard - Sinkholes (Severe Land Subsidence)

- ▶ 89 known sinkholes
 - ▶ DNR/USGS
 - ▶ 4 reported collapsed sinkholes since 1970
- ▶ No communities have sinkholes in city limits

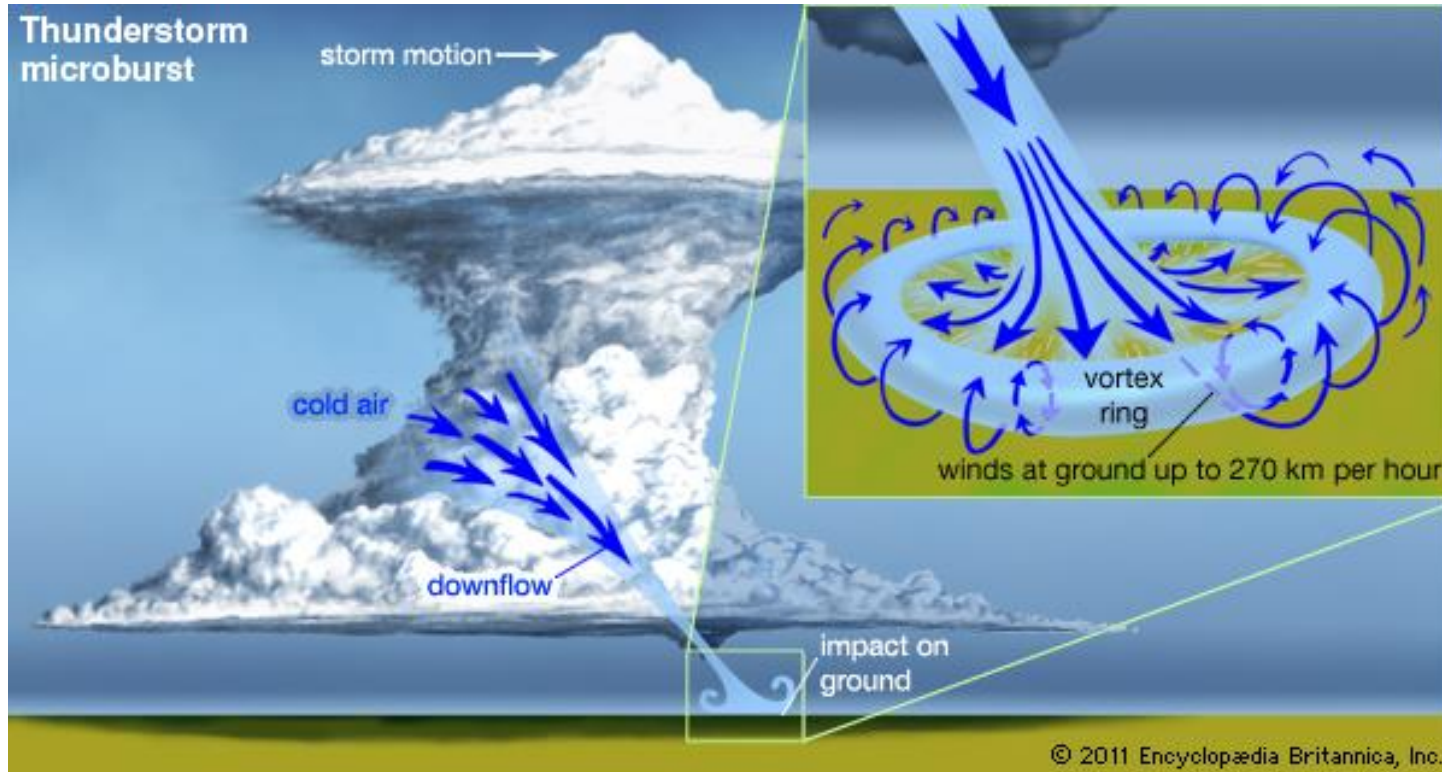


Past Occurrences

- ▶ Regular occurrence in Missouri; rarely significant
- ▶ Known occurrences?

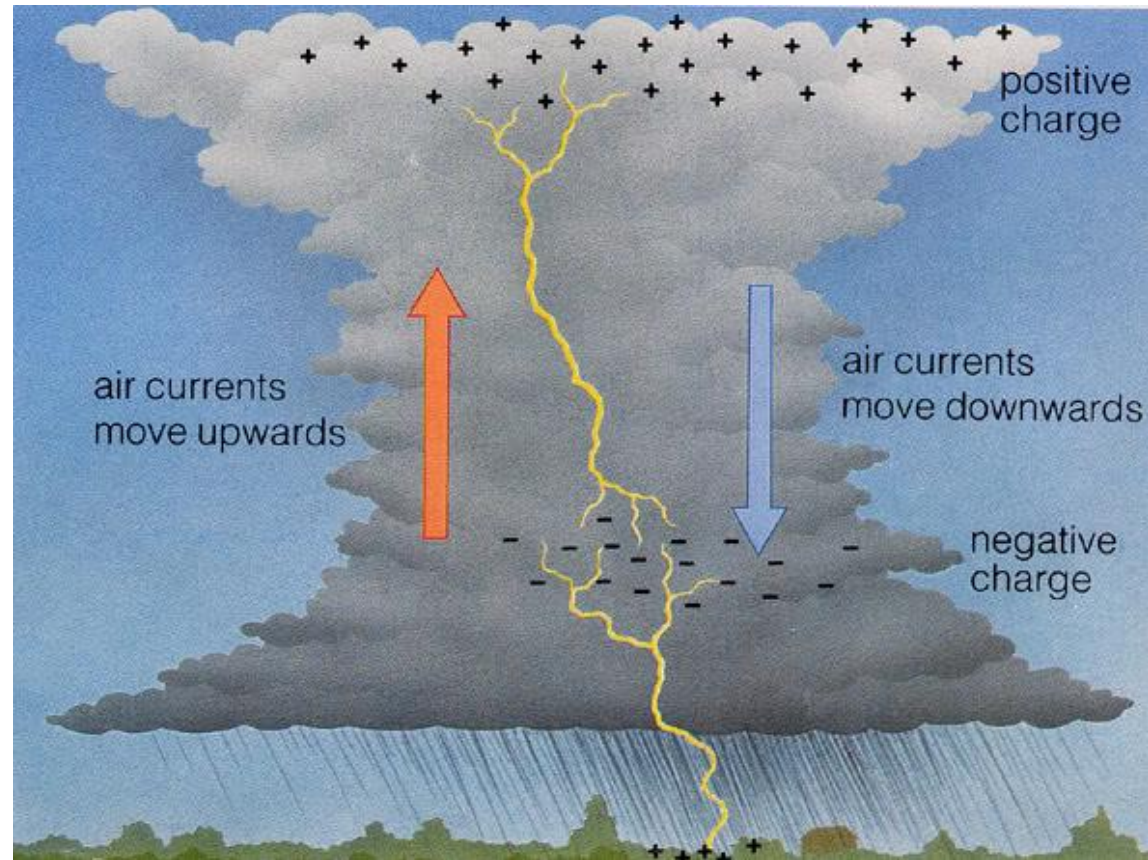
Identified Hazard: Severe Thunderstorm

- ▶ High Winds
 - ▶ Straight Line Wind, Microburst:
Can exceed 100 mph



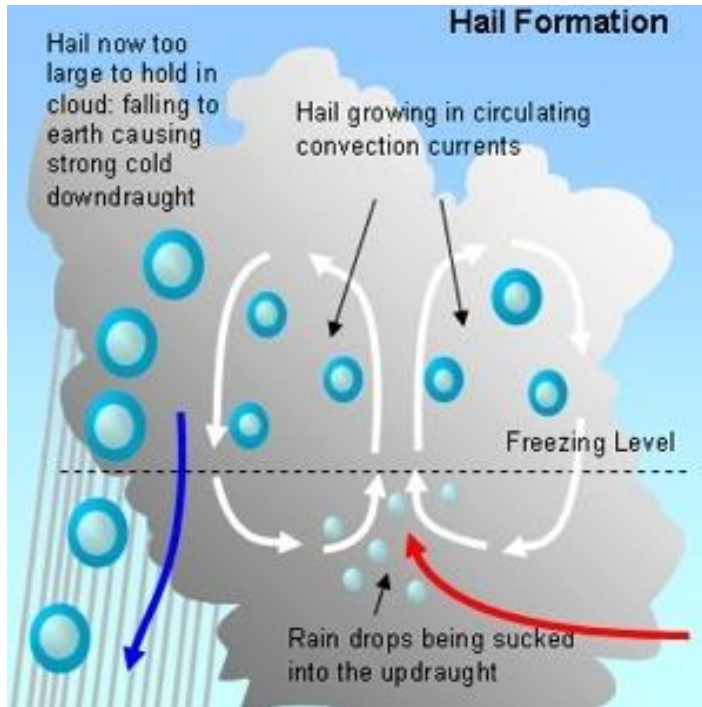
Identified Hazard: Severe Thunderstorm

- ▶ Lightning
 - ▶ Resulting in fires and power outages



Identified Hazard: Severe Thunderstorm

- ▶ Hail
 - ▶ Hail can reach the size of grapefruit



How do I measure hail?

*Measure at its widest point
*Estimate size to common objects

NO MARBLES!

Description	Hail Size (in.)
Pea	$\frac{1}{4}$
Penny	$\frac{3}{4}$
Quarter	1
Half-Dollar	$1\frac{1}{4}$
Ping Pong Ball	$1\frac{1}{2}$
Golfball	$1\frac{3}{4}$
Tennis Ball	$2\frac{1}{2}$
Baseball	$2\frac{3}{4}$
Softball	4
Grapefruit	$4\frac{1}{2}$

A collage of images at the bottom of the slide shows various hailstones and objects used for size comparison. It includes a large, irregular hailstone, a hand holding a large hailstone, a hand holding several smaller hailstones, a yellow highlighter, a US quarter coin, a US penny, and a golf ball.

Past Occurrences

▶ Thunderstorm Wind

- ▶ 162 reported occurrences from 1998-2017 with wind speeds from 50 - 80 mph
- ▶ 68 damaging events resulting in \$7,541,500 of damages
- ▶ 95% probability of a *damaging* event in any given year with average losses of **\$110,904** per damaging event
 - ▶ 1 year (2007) without damaging event

▶ Hail

- ▶ 183 reported occurrences 1998-2017; Largest size 3 inches in diameter
- ▶ 8 damaging events resulting in property damages of \$650,000
- ▶ 40% probability of a damaging event; average losses of **\$81,250** per damaging event

▶ Lightning

- ▶ Only lightning events that result in fatality, injury and/or property and crop damage are in the NCEI database
- ▶ 0 lightning events in the NCEI database from 1998-2017

Past Occurrences

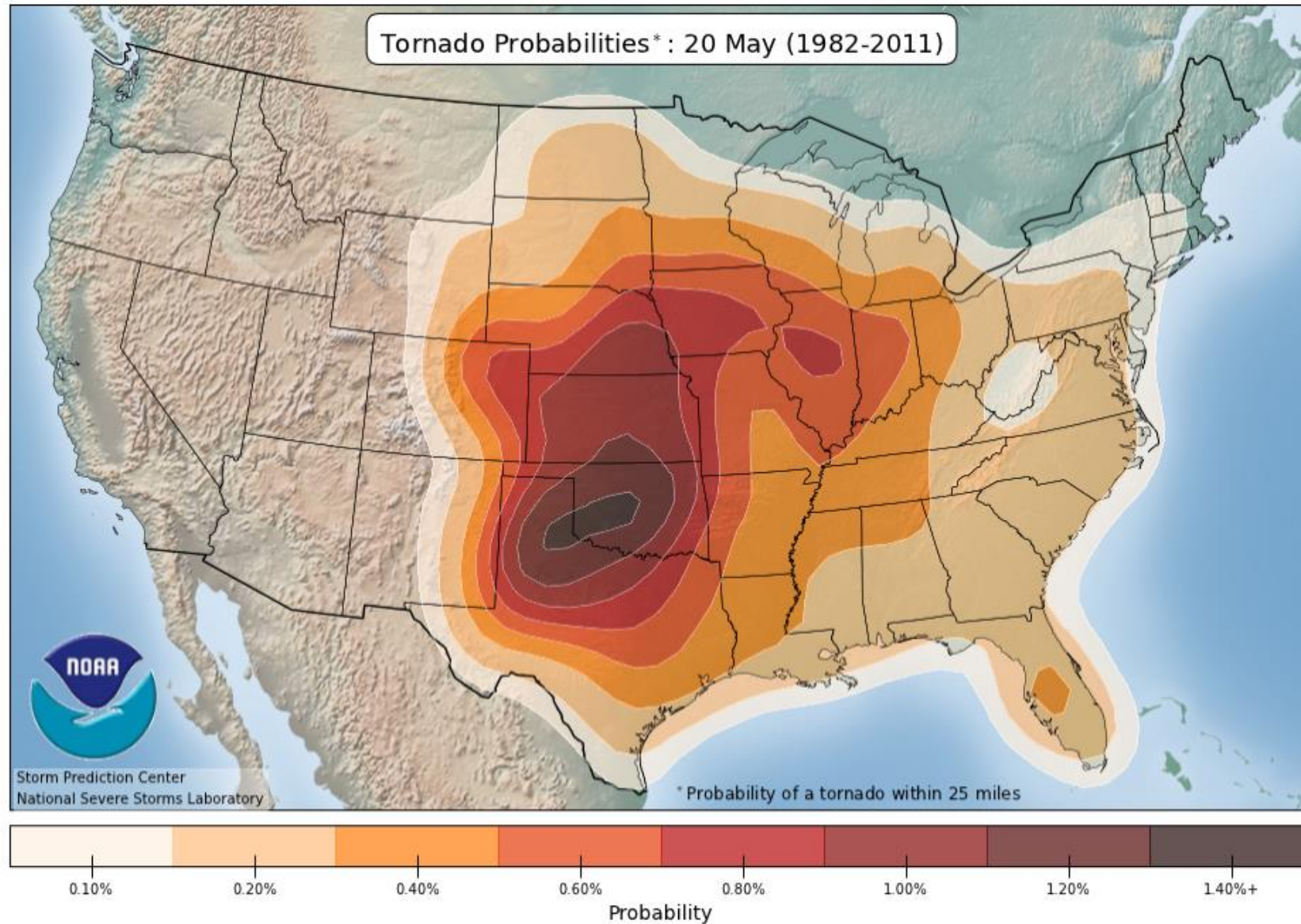
NCEI Reported Events and Damages from Thunderstorm Winds, 1998-2017					
Location	# of Events	Deaths	Injuries	Property Damage	Crop Damage
Polk County	16	0	1	\$7,170,000	\$0
Bolivar	17	0	0	\$123,000	\$0
Fair Play	3	0	0	\$4,000	\$0
Humansville	9	0	2	\$40,000	\$0
Morrisville	6	0	0	\$45,000	\$0
Pleasant Hope	7	0	0	\$117,000	\$0
Aldrich	1	0	0	\$5,000	\$0
Flemington	4	0	0	\$7,000	\$0
Goodnight	0	0	0	\$0	\$0
Halfway	5	0	0	\$30,500	\$0
Total	68	0	3	\$7,541,500	\$0

NCEI Reported Events and Damages from Hail, 1998-2017						
Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Bolivar	5/6/1998	1.75	0	0	\$30,000	\$0
Morrisville	4/30/2002	2.75	0	0	\$25,000	\$0
Bolivar	8/19/2002	0.88	0	0	\$15,000	\$0
Morrisville	5/25/2011	3	0	0	\$50,000	\$0
Morrisville	5/25/2011	1.75	0	0	\$10,000	\$0
Brighton	5/25/2011	1.75	0	0	\$10,000	\$0
Brighton	5/25/2011	1.75	0	0	\$10,000	\$0
Bolivar	4/7/2013	1.75	0	0	\$500,000	\$0
Total			0	0	\$650,000	\$0

Past Occurrences

- ▶ April, 2017: Bolivar High School sustained damage to its roof, as well as water damage in multiple classrooms

Identified Hazard: Tornado



Fujita Scale

Fujita and Enhanced Fujita Tornado Damage Scale

FUJITA SCALE			OPERATIONAL EF SCALE		Typical Damage
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	
0	40-72	45-78	0	65-85	Light damage - Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
1	73-112	79-117	1	86-110	Moderate damage - Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
2	113-157	118-161	2	111-135	Considerable damage - Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	158-207	162-209	3	136-165	Severe damage - Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
4	208-260	210-261	4	166-200	Devastating damage - Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
5	261-318	262-317	5	Over 200	Incredible damage - Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds.); trees debarked; incredible phenomena will occur.

Past Occurrences

- ▶ 19 Tornado events from 1998-2017
- ▶ 12 Events resulted in \$6,460,000 in Property Damage, \$1,000,000 in Crop Damage, 1 injury and 0 fatalities
 - ▶ One event accounted for \$3,700,000 in property damage and \$1,000,000 in crop damage
- ▶ 50% probability of a damaging event in any given year; property damages of \$538,333 per damaging event.

Scale	Occurrences/%	Damages	Injuries/Fatalities
F0/EF0	12/63%	\$135,000	0/0
F1/EF1	6/32%	\$2,625,000	1/0
F2/EF2	1/5%	\$3,700,000	0/0
F3/EF3*	0/0%	\$0	0/0
F4/EF4	0/0%	\$0	0/0
F5/EF5	0/0%	\$0	0/0
Total	19/100%	\$6,460,000	1/0

Past Occurrences

Date	Beginning Location	Ending Location	Length (miles)	Width (yards)	F/EF Rating	Injury	Death	Property Damage	Crop Damages
2/25/2000	Polk	Polk	1	100	F0	0	0	\$60,000	\$0
12/18/2002	Humansville	Humansville	6	100	F1	1	0	\$500,000	\$0
5/4/2003	Dunnegan	Polk	23	400	F2	0	0	\$3,700,000	\$1,000,000
5/4/2003	Rondo	Rondo	0.2	20	F0	0	0	\$0	\$0
5/6/2003	Morrisville	Morrisville	0.2	20	F0	0	0	\$0	\$0
3/12/2006	Humansville	Humansville	8	35	F0	0	0	\$0	\$0
6/30/2007	Eudora	Eudora	0.75	50	EF0	0	0	\$5,000	\$0
3/31/2008	Tin Town	Tin Town	0.84	50	EF0	0	0	\$25,000	\$0
5/8/2009	Brighton	Burns	8.61	250	EF1	0	0	\$2,000,000	\$0
11/24/2010	Brighton	Brighton	0.85	200	EF1	0	0	\$75,000	\$0
12/31/2010	Burns	Violet	1	50	EF0	0	0	\$5,000	\$0
6/18/2011	Knox	Eudora	4.69	100	EF1	0	0	\$0	\$0
6/18/2011	Brighton	Brighton	0.07	100	EF0	0	0	\$0	\$0
2/28/2012	Knox	Aldrich	5.38	100	EF1	0	0	\$50,000	\$0
2/28/2012	Schofield	Schofield	0.5	100	EF1	0	0	\$0	\$0
5/17/2015	Cliquot	Cliquot	1.7	200	EF0	0	0	\$0	\$0
5/17/2015	Cliquot	Sentinel	10.57	100	EF0	0	0	\$15,000	\$0
5/17/2015	Rondo	Rondo	2.09	100	EF0	0	0	\$20,000	\$0
5/19/2017	Knox	Knox	0.58	100	EF0	0	0	\$5,000	\$0
Total						1	0	\$6,460,000	\$1,000,000

Identified Hazard: Severe Winter Weather

- ▶ A Winter Storm is a winter weather event containing a mixture of snow, cold, wind, sleet and freezing rain; It can cause driving to be dangerous and can cause power outages.
- ▶ **Heavy Snow:** Large amount of just snowing falling over a period of time; Large amounts of snow can cause travel to become dangerous and the sheer weight of the snow can cause roofs and structures to collapse.
- ▶ **Ice Storm-Freezing Rain:** Freezing rain falls onto a surface with a temperature below freezing; heavy accumulations of ice can bring down trees, electric power lines and poles, telephone lines and communications towers.
- ▶ **Blizzard:** Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than ¼ mile for at least three hours.
- ▶ **Severe Cold:** A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria, on a widespread or localized basis.

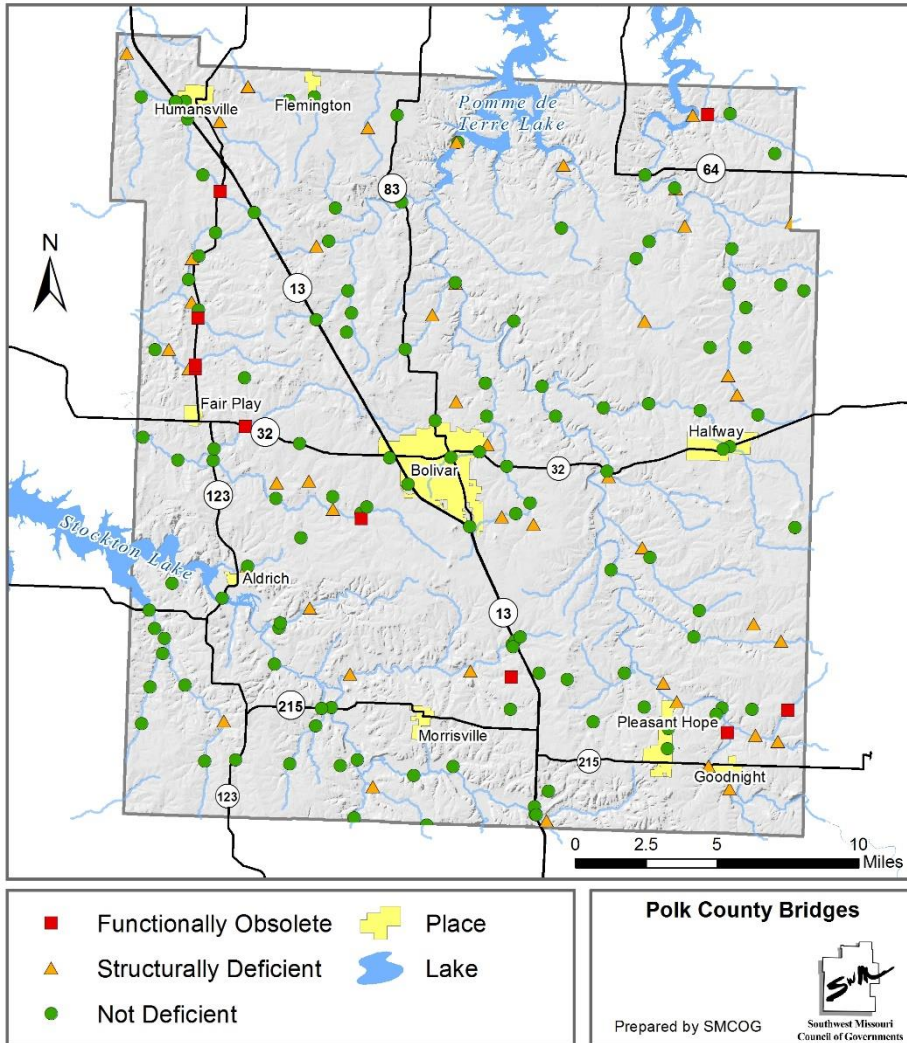
Past Occurrences

- ▶ Winter Storm - 20 recorded events from 1998-2017
 - ▶ 1 event in 1999 resulting in \$125,000 of damages
 - ▶ 5% probability of a damaging event in any given year; property damages of **\$125,000** per damaging event
- ▶ Heavy Snow - 1 event from 1998-2017
 - ▶ No damages, injuries, or deaths
- ▶ Ice Storm - 7 events from 1998-2017
 - ▶ 2 damaging events in 2007 resulted in \$1,050,000 of property damage
 - ▶ 10% probability of a damaging event over 20 years; 5% probability of a damaging event in any given year; **\$750,000** per damaging event.

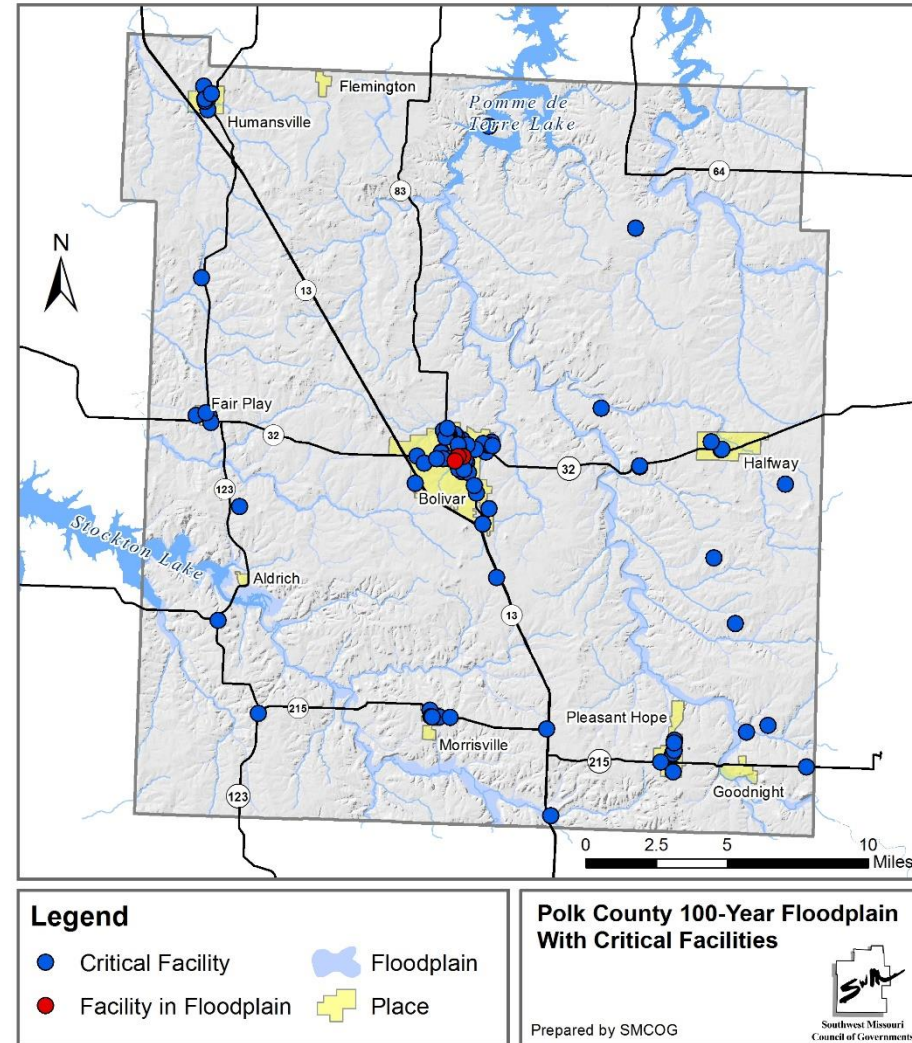
Past Occurrences

- ▶ Severe Cold - 2 events from 1998-2017
 - ▶ 0 damaging events
- ▶ Frost/Freeze- 1 event from 1998-2017
 - ▶ 1 damaging event resulted in \$5,280,000 of crop damage (2007)
- ▶ 32 total events from 1998-2017; 17 years with events
 - ▶ 85% probability of event in any given year
 - ▶ 4 damaging events; 10% probability of damaging event in any given year

Critical and Essential Facilities



Source: National Bridge Inventory, 2016



Source: MISDIS, 2014

Vulnerability

- ▶ Which hazards is your jurisdiction most at risk?
- ▶ What facilities and/or areas are most at risk to those hazards?
- ▶ What existing mechanism are in place to help mitigate negative consequences?

Mitigation Strategies

- ▶ Review old strategies from previous Polk County Hazard Mitigation Plan
- ▶ Determine current status and relevance
- ▶ Modify, keep, remove previous strategies
- ▶ Develop new strategies

Future Meetings

- ▶ Meeting 3: March 14, 1:00 p.m.
 - ▶ STAPLEE Scoring of Mitigation Strategies
 - ▶ Questions
- ▶ Meeting 4: April 18, 1:00 p.m.
 - ▶ Final Wrap-Up
 - ▶ Plan Maintenance

Draft Plan Submitted to SEMA: May 2, 2018
Final Plan Approval By: September 27, 2018

Contact Information

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For more information, visit our website:

www.smcog.org