

Taney County Hazard Mitigation Plan Update Meeting #2

July 25, 2017

Megan Clark, Planner

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 Commission 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 calculation
 - ▶ Annual Salary/2080
- ▶ 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→ July 11th
- ▶ Task 4: Review Community Capabilities→ Questionnaire - any questions?
- ▶ Task 5: Conduct a Risk Assessment → Today
- ▶ Task 6: Develop a Mitigation Strategy→ Meetings #3 and #4
- ▶ Task 7: Review and Adopt the Plan → Meeting #5 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

Disaster Number	Description	Declaration Date	Individual Assistance Public Assistance
4317	Severe Storms, Straight-line Winds, Flooding, Tornadoes	June 2, 2017	Individual & Public Assistance
4250	Severe Storms, Straight-line Winds, Flooding, Tornadoes	January 21, 2016	Individual & Public Assistance
4238	Severe Storms, Straight-line Winds, Flooding, Tornadoes	August 07, 2015	Public Assistance
4144	Severe Storms, Straight-line Winds, Flooding	September 06, 2013	Public Assistance
1980	Severe Storms, Tornadoes, Flooding	May 09, 2011	Individual & Public Assistance
1822	Severe Winter Storm	February 17, 2009	Public Assistance
1809	Severe Storms, Flooding, Tornado	November 13, 2008	Individual & Public Assistance
1773	Severe Storms, Flooding	June 25, 2008	Individual & Public Assistance
1749	Severe Storms, Flooding	March 19, 2008	Individual & Public Assistance
1631	Severe Storms, Tornadoes, Flooding	March 16, 2006	Individual Assistance
1463	Severe Storms, Tornadoes, Flooding	May 06, 2003	Individual Assistance
1412	Severe Storms, Tornadoes	May 06, 2002	Individual & Public Assistance
955	Flooding, Severe Storm	July 09, 1993	Individual 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

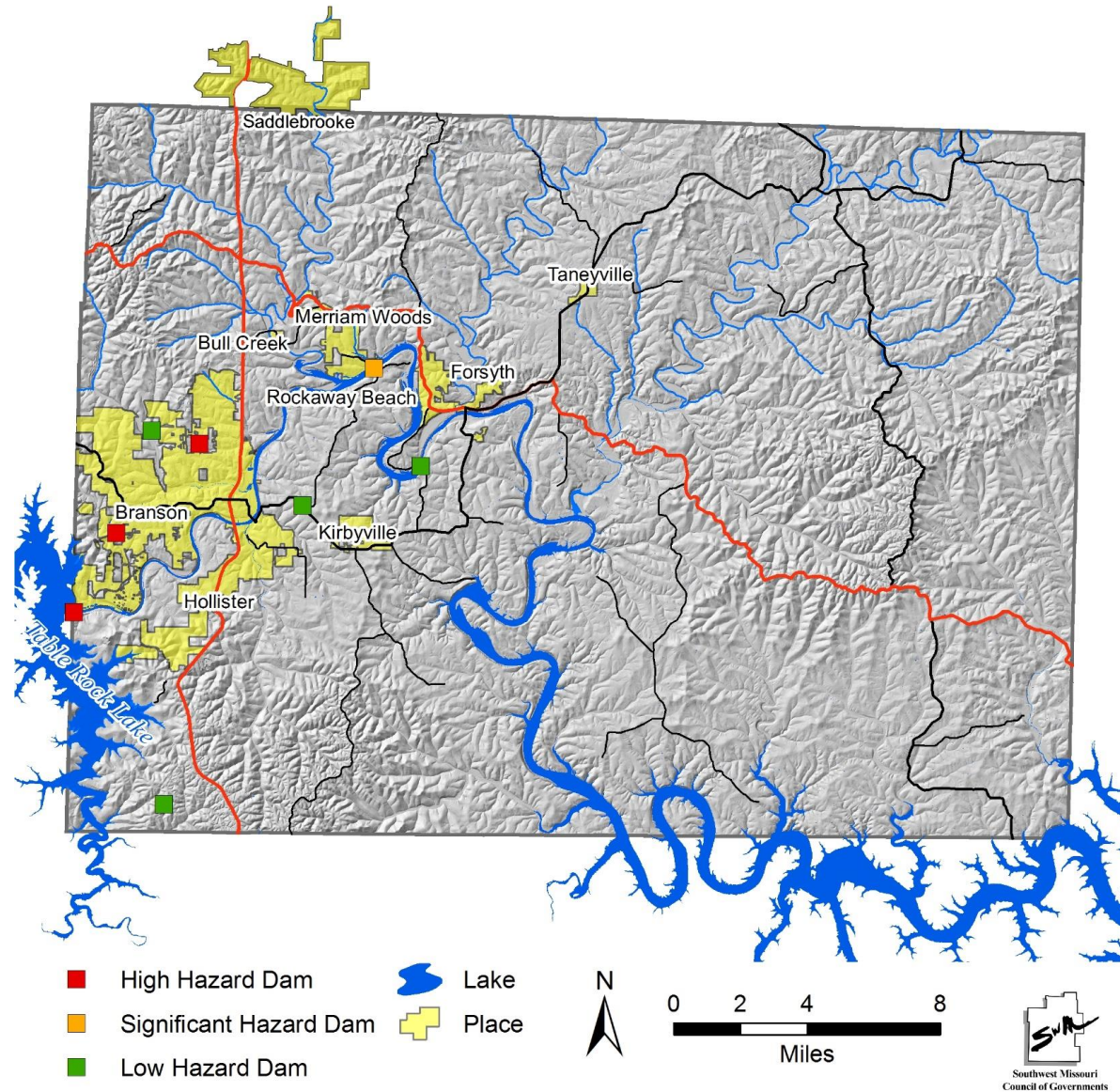
MDNR Dam Hazard Classification Definitions	
Hazard Class	Definition
Class I	The area downstream from the dam that would be affected by inundation contains ten (10) or more permanent dwellings or any public building. Inspection of these dams must occur every two years
Class II	The area downstream from 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.

Identified Hazard: Dam Failure

- ▶ 8 NID dams in planning area
 - ▶ 3 High Hazard
 - ▶ 1 Significant Hazard
 - ▶ 4 Low Hazard



Past Occurrences

- ▶ Erosion and failure of Silver Creek Dam near Rockaway Beach in 2004
 - ▶ Heavily eroded due to improperly located spillway discharge channel
 - ▶ Threatened safety of one permanent residence
 - ▶ Reduced property values of residences located adjacent to Lake Taneycomo
 - ▶ Washed out section of Missouri 176
 - ▶ Dumped tons of silt into Lake Taneycomo
 - ▶ New ownership is working with state agencies to maintain Silver Creek Dam
- ▶ Dam failure rare in Taney County; probability difficult to determine

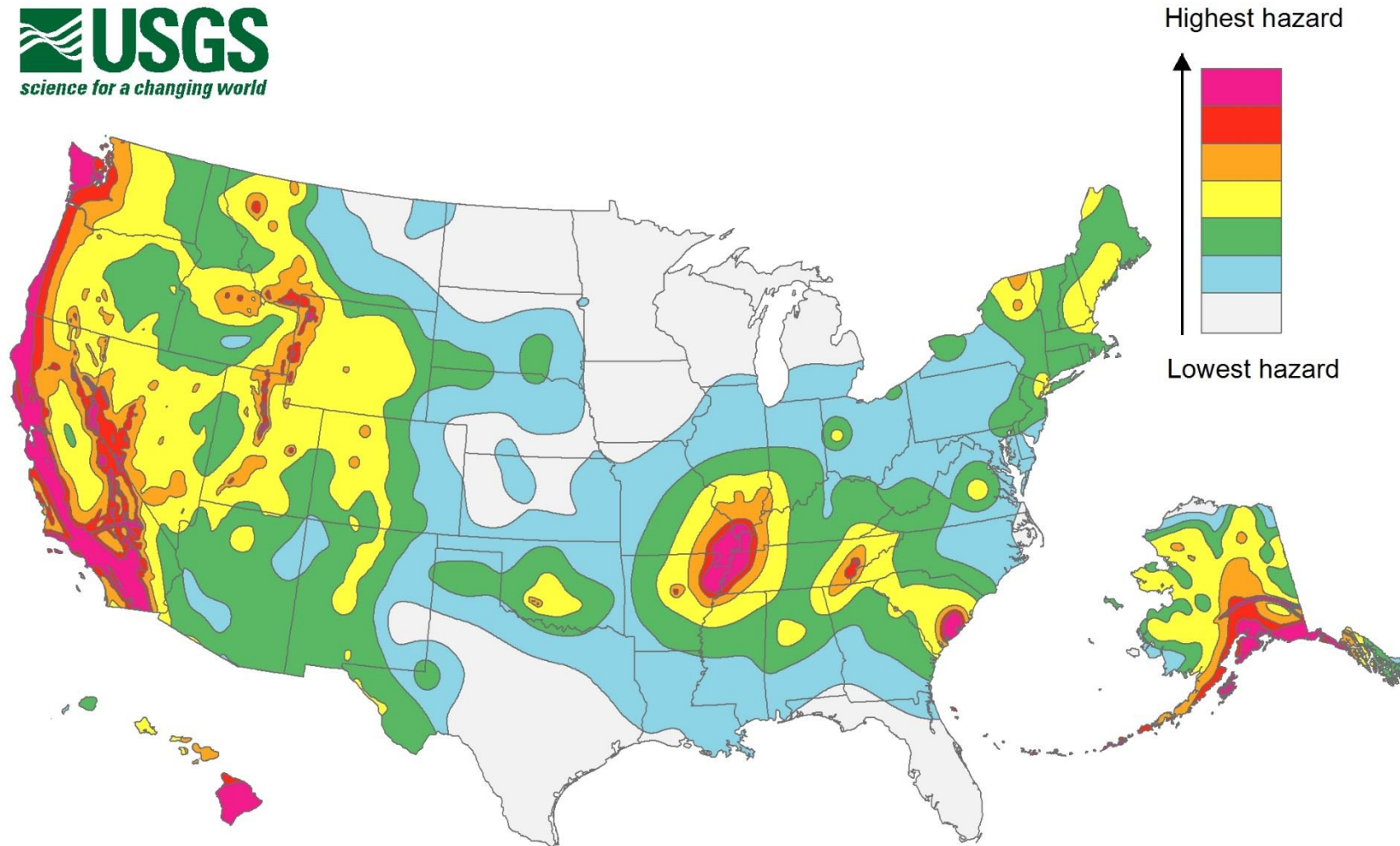
Identified Hazard: Drought

- ▶ **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

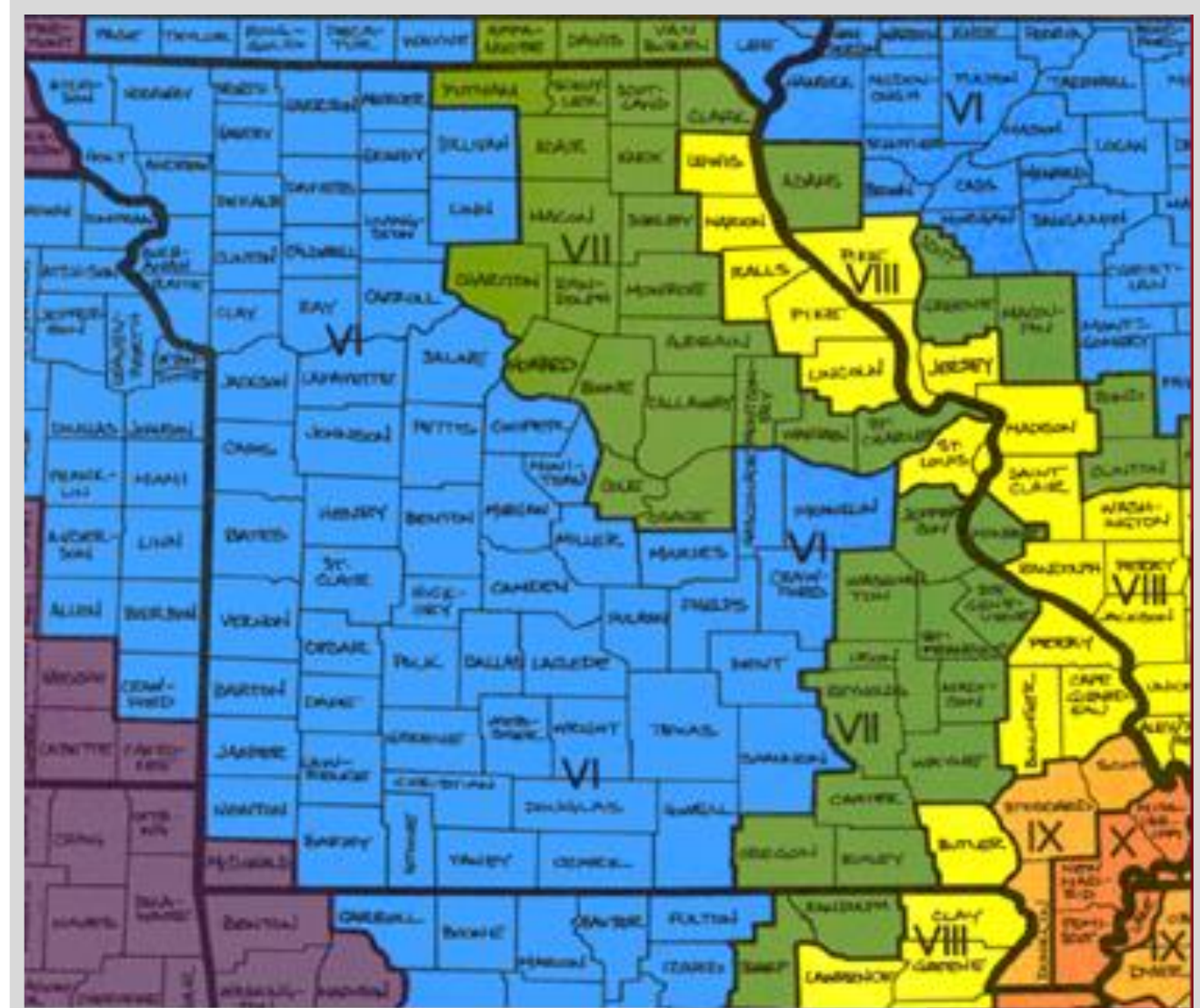
- ▶ 19 events from 1998-2017
 - ▶ 3 events resulted in damages
 - ▶ 1999 - \$20,000 crop damage
 - ▶ 2011 - \$5,000,000 crop damage
 - ▶ 2012 - \$760,000 crop damage
 - ▶ 15% probability of a damaging event; average losses of \$1,926,667 in crop damages per damaging event

Identified Hazard: Earthquake

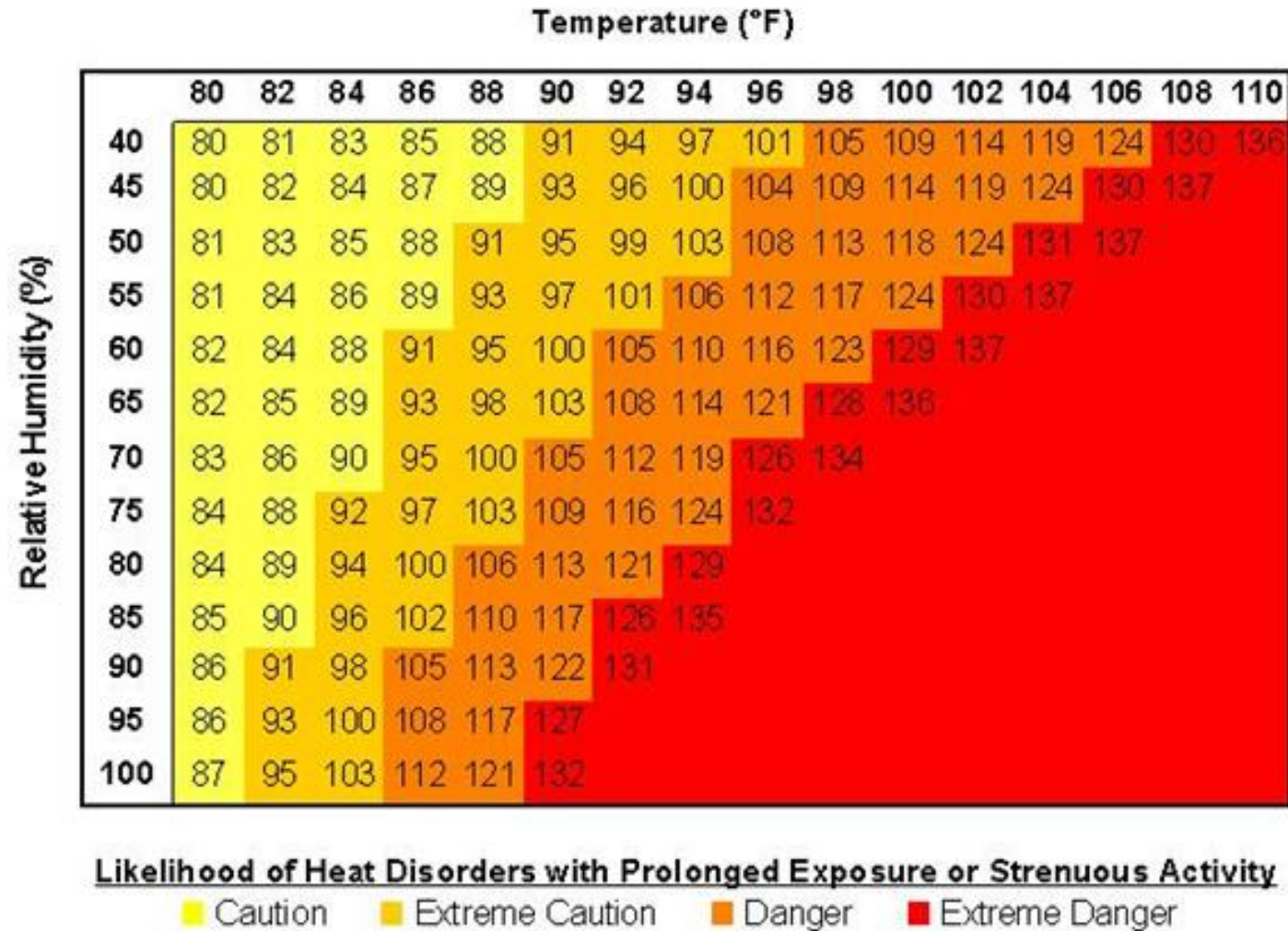


Identified Hazard: Earthquake

- ▶ 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 Taney County



Identified Hazard: Extreme Heat

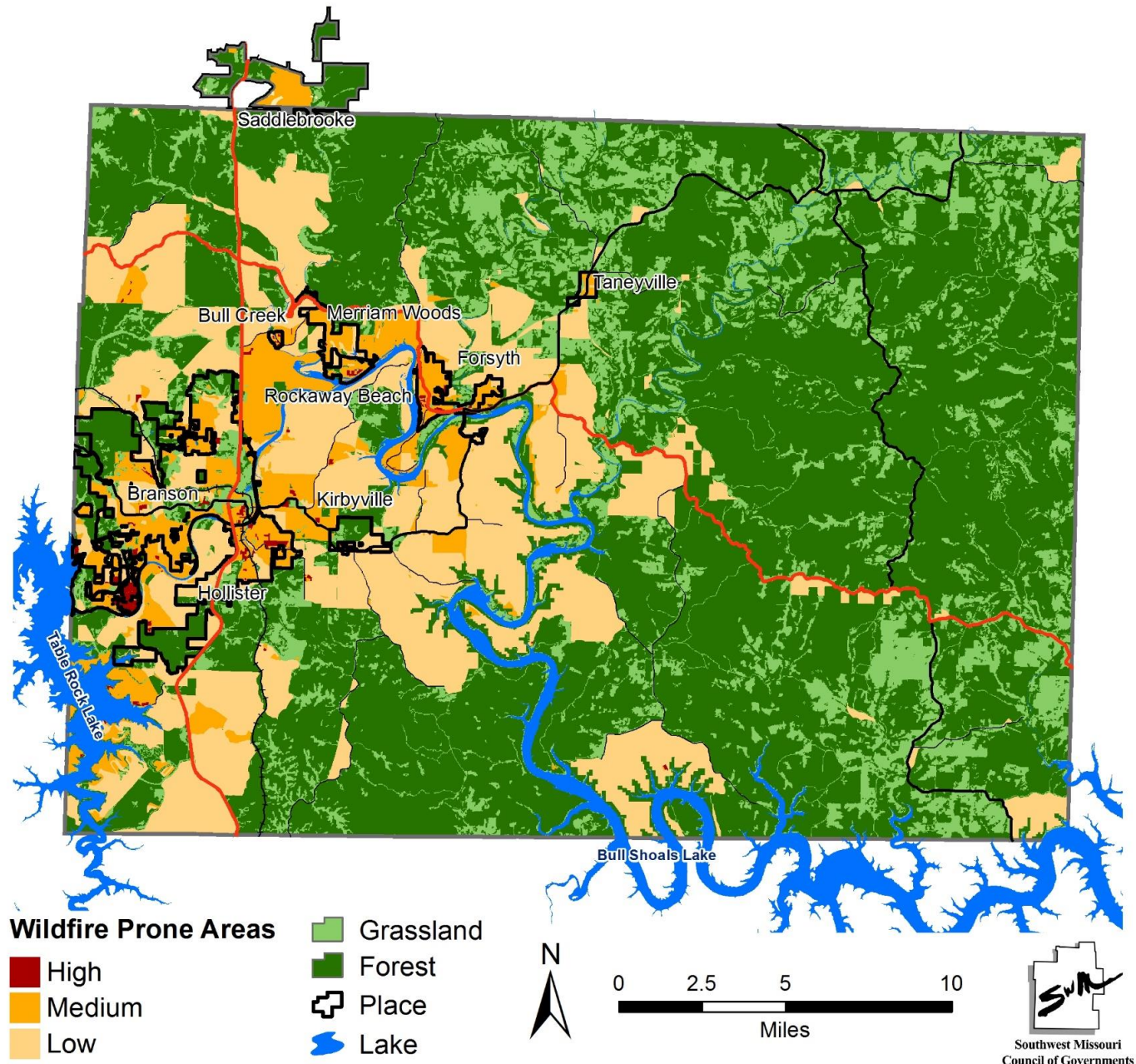


Past Occurrences

- ▶ 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 are near wildfire prone areas
- ▶ Large areas of medium risk
- ▶ Several small areas of high risk



Past Occurrences

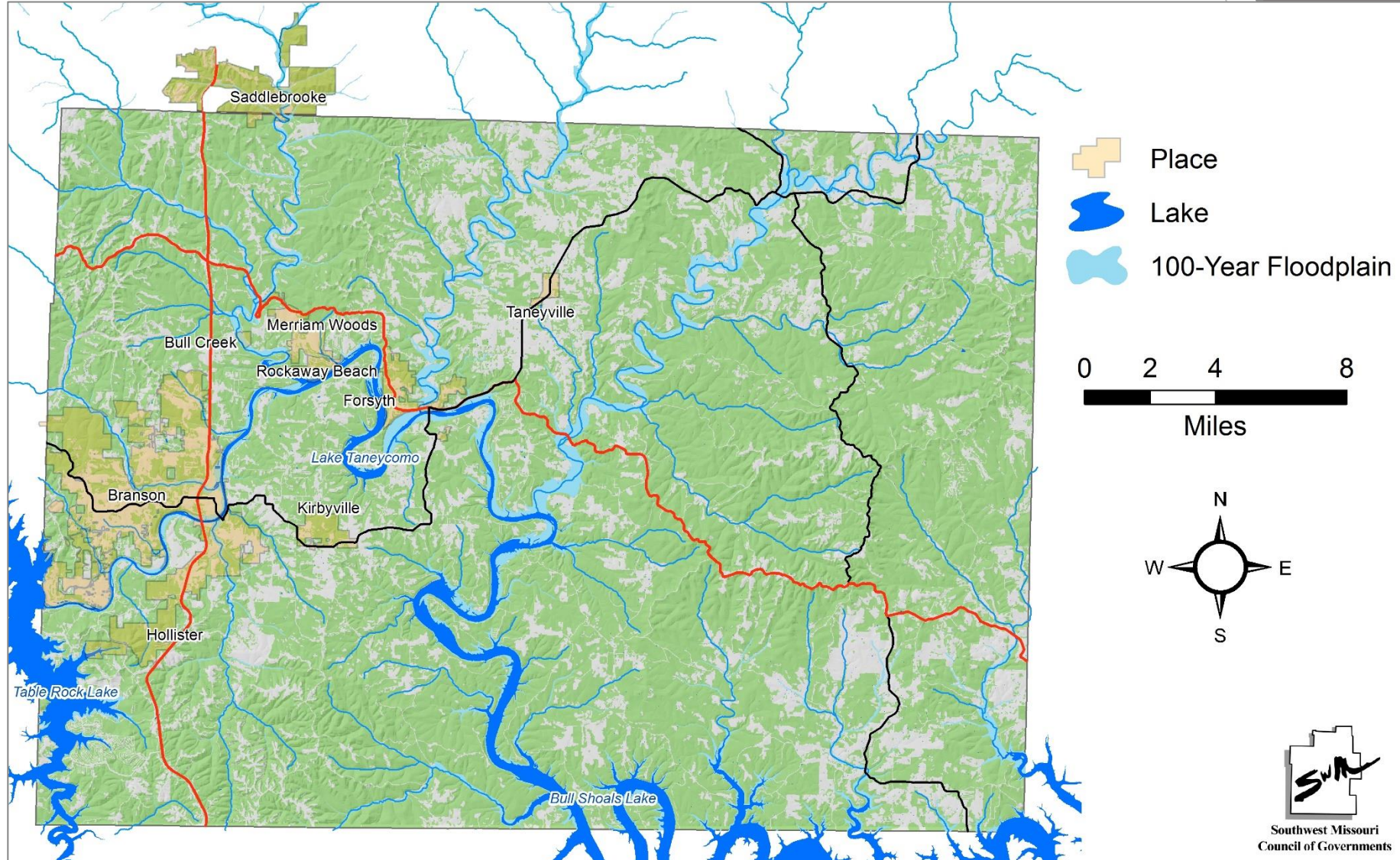
▶ NOAA/NCDC

- ▶ 3 events from 1998-2017
 - ▶ 2 damaging events resulted in \$30,000 in property losses
 - ▶ 10% probability of a damaging event
 - ▶ \$15,000 average loss per damaging event

▶ MDC Fire Reporting

- ▶ 891 events from 2008-2017
 - ▶ 6,930.32 acres burned
 - ▶ 18 buildings destroyed
 - ▶ 38 buildings damaged
 - ▶ 425 buildings threatened

Identified Hazard: Riverine and Flash Flood



Past Occurrences

▶ **Riverine Flood - 19 recorded events from 1998-2017**

- ▶ 3 damaging events resulting in \$3,450,000 in property damage; 2 years with damaging events
- ▶ 10% probability of a damaging event in any given year with average losses of \$1,150,000

▶ **Flash Flood - 70 events from 1998-2017**

- ▶ 19 events resulting \$28,605,000 in damages; 7 years with damaging events
- ▶ 35% probability of a damaging event in any given year with average losses of \$1,505,526 per damaging event

Past Occurrences

NCDC Taney County Riverine Flood Events Summary, 1997-2017

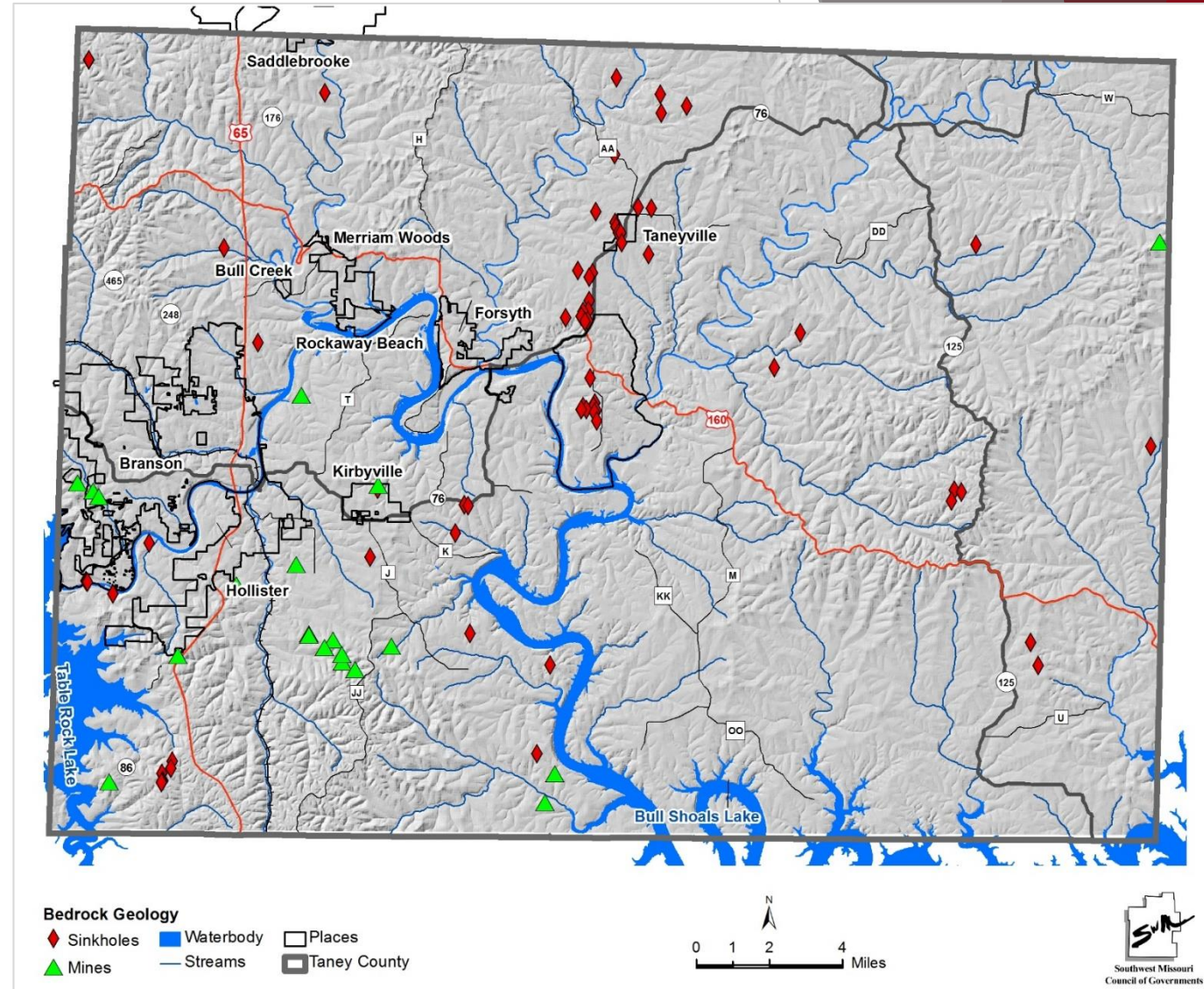
Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2001	1	0	0	\$0	\$0
2002	4	0	0	\$400,000	\$0
2004	2	0	0	\$0	\$0
2005	1	0	0	\$0	\$0
2008	3	0	0	\$0	\$0
2010	1	0	0	\$0	\$0
2013	1	0	0	\$0	\$0
2015	3	0	0	\$3,050,000	\$0
2017	3	0	0	\$0	\$0
Total	19	0	0	\$3,450,000	\$0

NCDC Taney County Flash Flood Events Summary, 1998-2017

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1998	3	0	0	\$0	\$0
1999	3	0	0	\$0	\$0
2000	3	0	0	\$0	\$0
2001	1	0	0	\$0	\$0
2002	2	0	0	\$0	\$0
2003	1	0	0	\$0	\$0
2004	2	0	0	\$0	\$0
2005	2	0	0	\$5,000	\$0
2006	2	0	0	\$0	\$0
2007	5	0	0	\$0	\$0
2008	9	0	0	\$5,640,000	\$0
2009	2	0	0	\$0	\$0
2010	1	0	0	\$0	\$0
2011	7	0	0	\$10,000,000	\$0
2013	4	0	0	\$1,000,000	\$0
2015	13	0	0	\$1,860,000	\$0
2016	4	0	0	\$100,000	\$0
2017*	6	0	0	\$10,000,000	\$0
Total	70	0	0	\$28,605,000	\$0

Identified Hazard - Sinkholes (Severe Land Subsidence)

- ▶ 65 known sinkholes
 - ▶ DNR/USGS
- ▶ Communities with sinkholes in city limits
 - ▶ Branson, Kirbyville, Taneyville

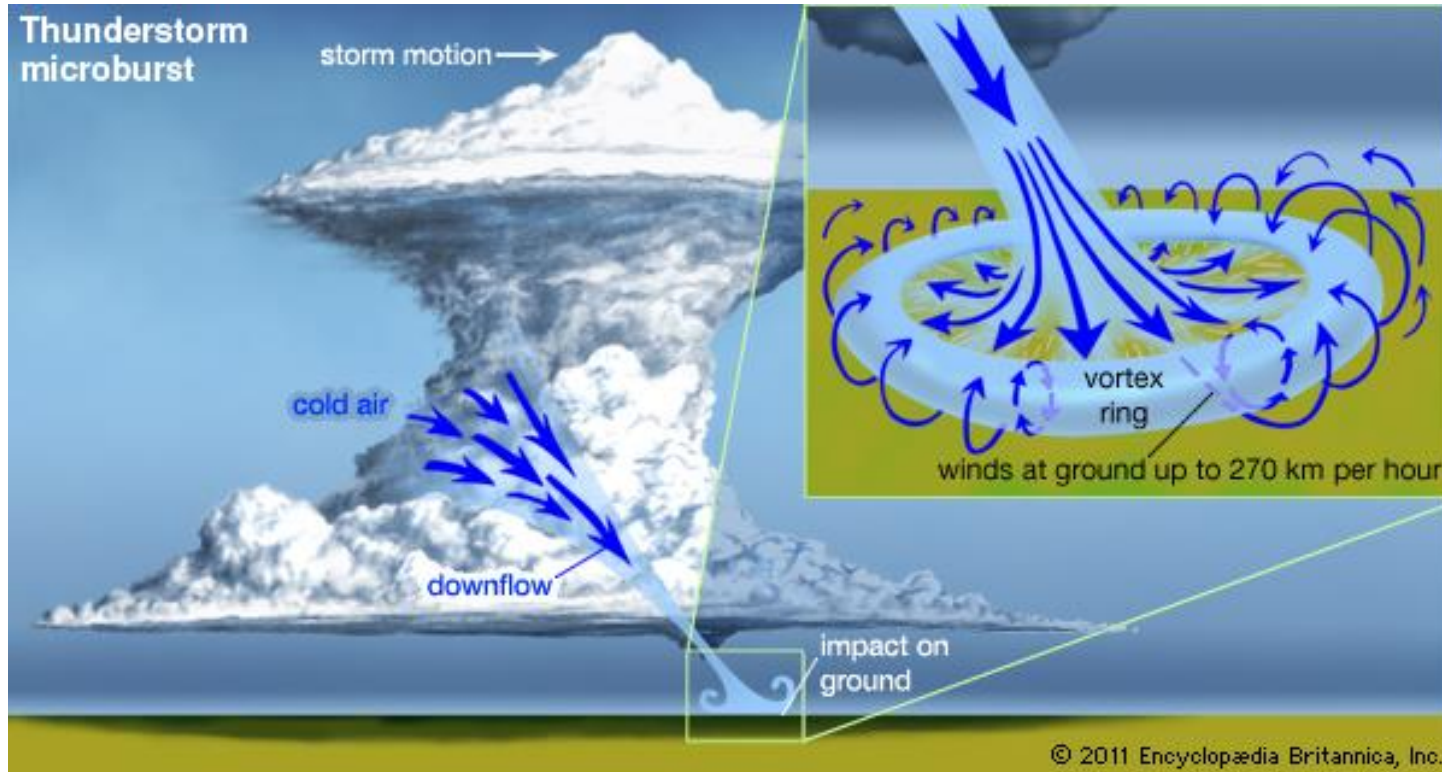


Past Occurrences

- ▶ Regular occurrence in Missouri; rarely significant
- ▶ May 2015: local news sources reported opening of a sinkhole at Top of the Rock Golf Course
 - ▶ 70 feet wide, 40 feet deep
- ▶ Other known occurrences?

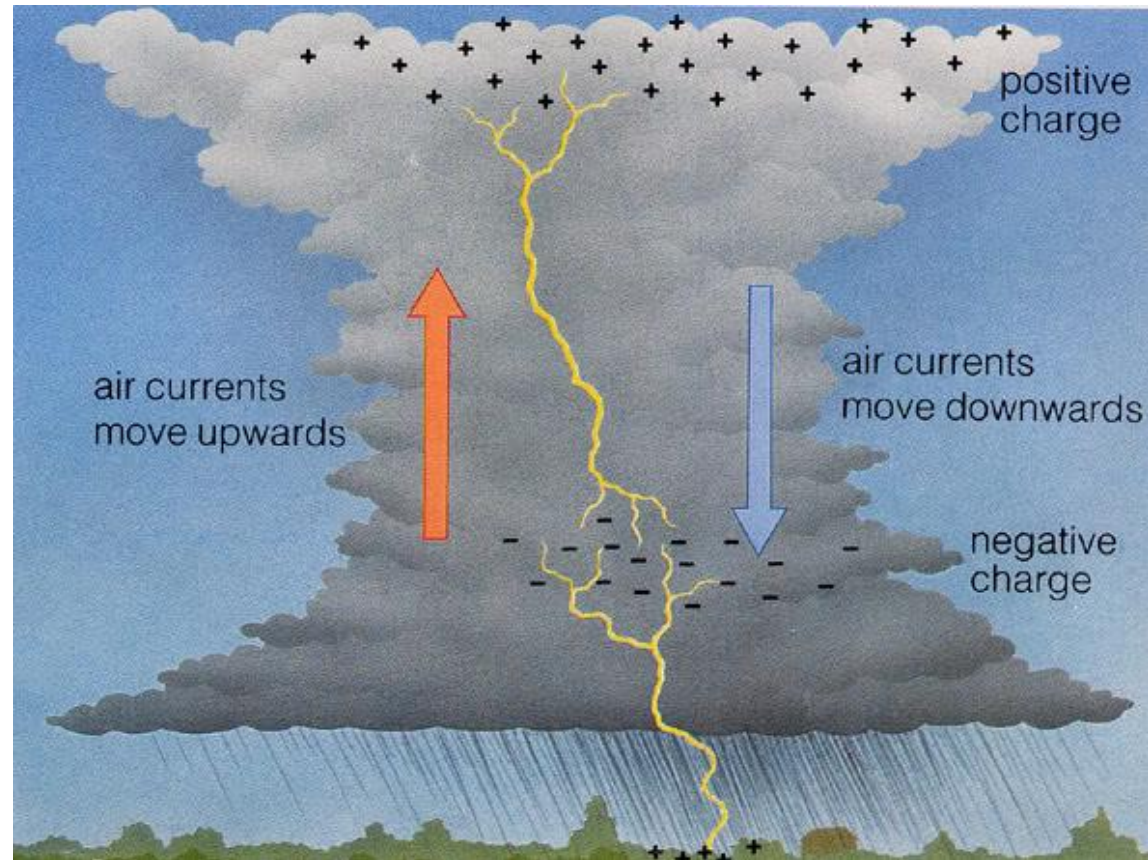
Identified Hazard: Severe Thunderstorm

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



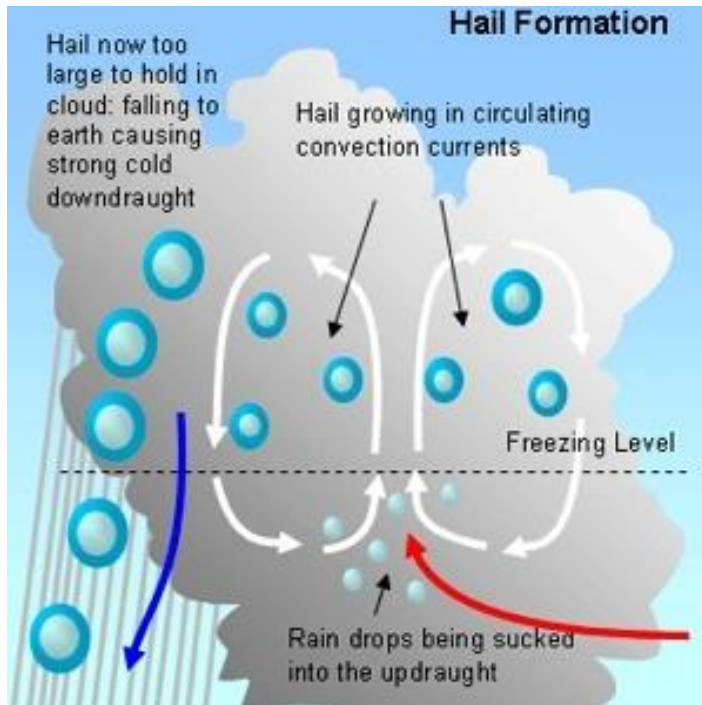
Identified Hazard: Severe Thunderstorm

- ▶ Lightning
 - ▶ Resulting in fires and power outages



Identified Hazard: Severe Thunderstorm

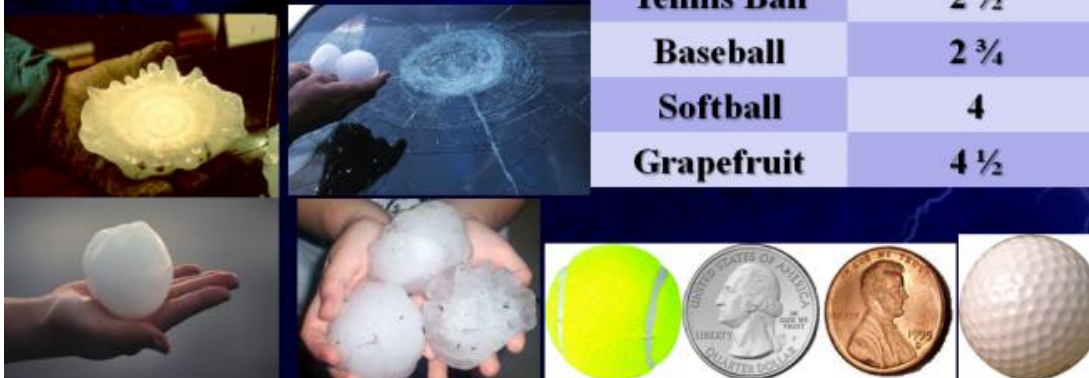
- ▶ Hail
 - ▶ Hail can reach the size of grapefruit



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	$4 \frac{1}{2}$

Past Occurrences

▶ Thunderstorm Wind

- ▶ 124 reported occurrences from 1998-2017 with wind speeds from 50 - 80 mph
- ▶ 46 damaging events resulting in \$1,378,000
- ▶ 90% probability of a *damaging* event in any given year with average annualized losses of **\$68,950**
 - ▶ 2 years (2002-2003) without damaging event

▶ Hail

- ▶ 128 reported occurrences 1998-2017; Largest size 2.75 inches in diameter
- ▶ 4 damaging events resulting in property damages of \$565,000
- ▶ 20% probability of a damaging event; average losses of **\$141,250** per damaging event

▶ Lightning

- ▶ 4 damaging events from 1998-2017 : \$780,000 in property damage
- ▶ 20% probability of a damaging event with average losses per damaging event of **\$195,000**

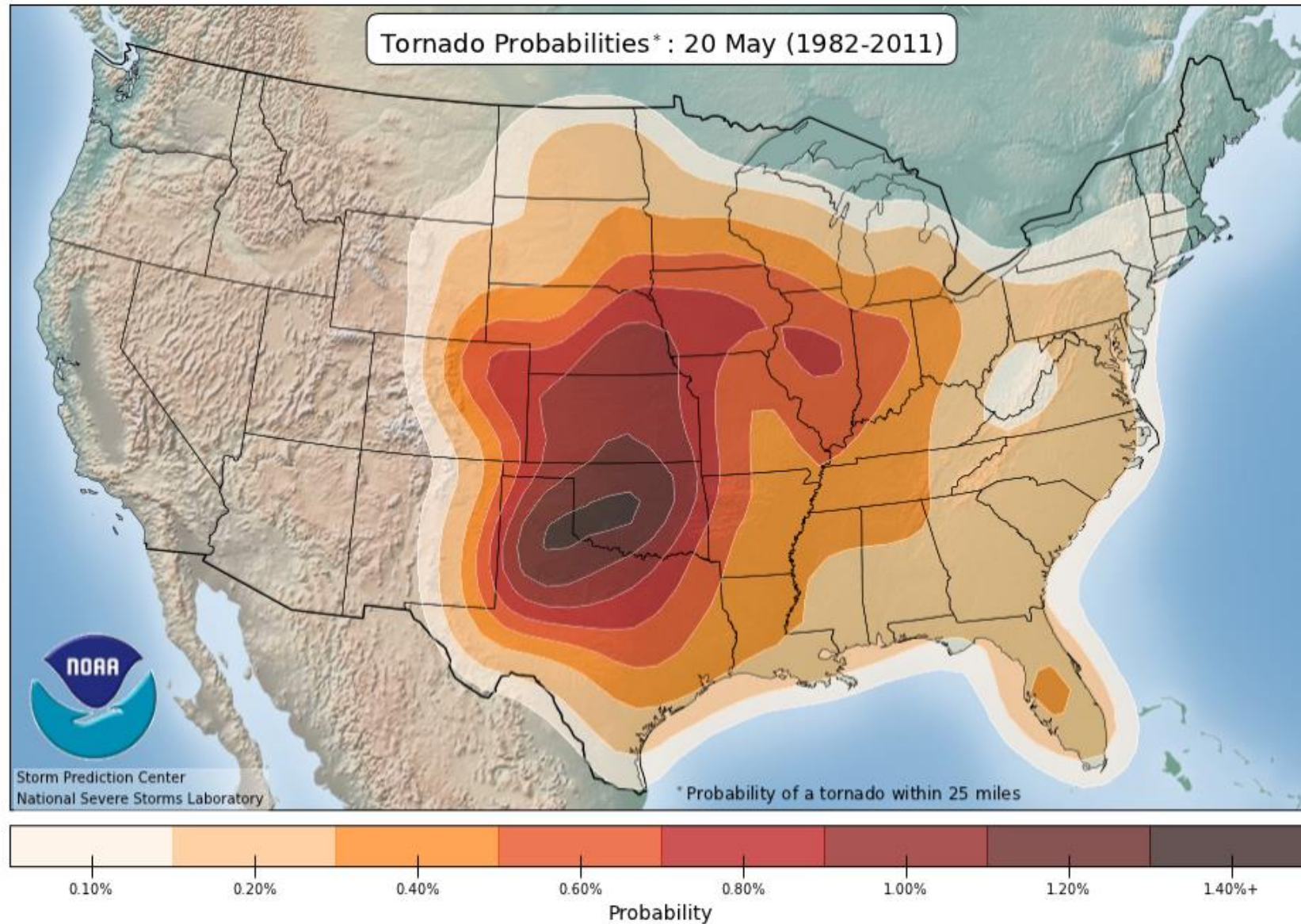
Past Occurrences

NCDC Reported Events with Damages from Thunderstorm Winds, 1998-2017					
Location	# of Events	Deaths	Injuries	Property Damage	Crop Damage
Taney County	43	0	1	\$562,000	\$0
Branson	32	0	1	\$205,000	\$0
Forsyth	25	0	0	\$37,000	\$0
Hollister	11	0	1	\$218,000	\$0
Kirbyville	2	0	0	\$15,000	\$0
Rockaway Beach	7	0	0	\$25,000	\$0
Taneyville	4	0	2	\$62,000	\$0
Total	124	0	5	\$1,378,000	\$0

NCDC Reported Events and Damages from Hail, 1998-2017						
Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Branson	5/9/1998	1.75	0	0	\$50,000	\$0
Branson	3/12/2006	2.5	0	0	\$500,000	\$0
Taney County	10/1/2009	1	0	0	\$5,000	\$0
Taney County	3/9/2017	1.5	0	0	\$10,000	\$0
Total			0	0	\$565,000.00	\$0

NCDC Reported Events and Damages from Lightning, 1998-2017					
Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Branson	7/4/2001	0	0	\$25,000	\$0
Branson	11/14/2005	0	0	\$5,000	\$0
Taney County	5/17/2015	0	0	\$500,000	\$0
Taney County	3/26/2017	0	0	\$250,000	\$0
Total		0	0	\$780,000	\$0

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

- ▶ <https://www.ncdc.noaa.gov/stormevents/>
- ▶ 10 Tornado events from 1994-2017
- ▶ 10 Events resulted in \$15,765,500 in Property Damage, \$0 in Crop Damage, 37 injuries and 0 fatalities
 - ▶ One event accounted for \$15,000,000 in property damage
- ▶ 25% probability of a damaging event in any given year; property damages of **\$1,970,688** per damaging event.

Scale	Occurrences/%	Damages	Injuries/Fatalities
F0/EF0	7/70%	\$215,500	0/0
F1/EF1	2/20%	\$550,000	0/0
F2/EF2	1/10%	\$15,000,000	37/0
F3/EF3*	0/0%	\$0	0/0
F4/EF4	0/0%	\$0	0/0
F5/EF5	0/0%	\$0	0/0
Total	10/100%	\$15,645,500	37/0

Past Occurrences

Date	Beginning Location	Ending Location	Length (miles)	Width (yards)	F/EF Rating	Death	Injury	Property Damage	Crop Damages
4/27/1994	Forsyth	Forsyth	0.5	30	F0	0	0	\$500	\$0
6/8/1995	Forsyth	Forsyth	0.1	100	F0	0	0	\$0	\$0
3/11/2006	Branson	Forsyth	8	20	F0	0	0	\$0	\$0
1/8/2008	Branson Memorial Airport	Point Lookout Airport	2.88	20	EF0	0	0	\$75,000	\$0
5/8/2009	Swan	Swan	2.76	150	EF1	0	0	\$500,000	\$0
4/24/2010	Branson Memorial Airport	Branson Memorial Airport	0.51	70	EF0	0	0	\$20,000	\$0
5/22/2011	Day	Day	4.75	200	EF1	0	0	\$50,000	\$0
2/29/2012	Branson Memorial Airport	Kissee Mills	16.54	400	EF2	0	37	\$15,000,000	\$0
3/09/2017	Ike	Ike	0.1	75	EF0	0	0	\$20,000	\$0
3/9/2017	Forsyth	Forsyth	1.9	100	EF0	0	0	\$100,000	\$0
Total						0	37	\$15,765,500	\$0

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 - 22 recorded events from 1998-2017
 - ▶ 0 events resulting in \$0 of damages
- ▶ Heavy Snow - 1 event from 1998-2017
 - ▶ \$ 0 in property damages
 - ▶ No significant heavy snow event since 1997
- ▶ Ice Storm/Freezing Rain - 3 events from 1998-2017
 - ▶ 0 damaging events resulted in \$0 of property damage
 - ▶ Most recent in 2009

Past Occurrences

- ▶ Severe Cold - 2 events from 1998-2017
 - ▶ 0 damaging events resulted in \$0 of property damage
 - ▶ Most recent in 2001
- ▶ Frost/Freeze- 1 event from 1998-2017
 - ▶ 1 damaging events resulted in \$1,210,000 of crop damage (2007)
- ▶ 29 total events from 1998-2017; 16 years with events
 - ▶ 80% probability of event in any given year
 - ▶ 1 damaging event; 5% probability of damaging event in any given year

Mitigation Strategies

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

Future Meetings

- ▶ Meeting 3: August 22, 9 a.m.
 - ▶ Review Goals, Objectives & Mitigation Strategies
 - ▶ Questions
- ▶ Meeting 4: September 26, 9 a.m.
 - ▶ STAPLEE Scoring of Mitigation Strategies
 - ▶ Questions
- ▶ Meeting 5: October 24, 9 a.m.
 - ▶ Final Wrap-Up
 - ▶ Plan Maintenance

Draft Plan Submitted to SEMA: November 1, 2017
Final Plan Approval By: January 17, 2018

Contact Information

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For more information, visit our website:

www.smcog.org