Ready, Set, ASSESS!

How to Conduct a Meaningful Risk Assessment with Limited Resources

pennsylvania
EMERGENCY MANAGEMENT AGENCY
PEMA

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Risk Assessment Requirements

As per 44 CFR (Code of Federal Regulations), Section 201.6, the Risk Assessment section of a Hazard Mitigation Plan must include, for each identified hazard of concern→

1. Location and Extent
2. Description of Impact
3. Previous Occurrences
4. Probability of Future Occurrence
5. Overall Vulnerability (assets and potential $ losses)

Risk Assessment Requirements

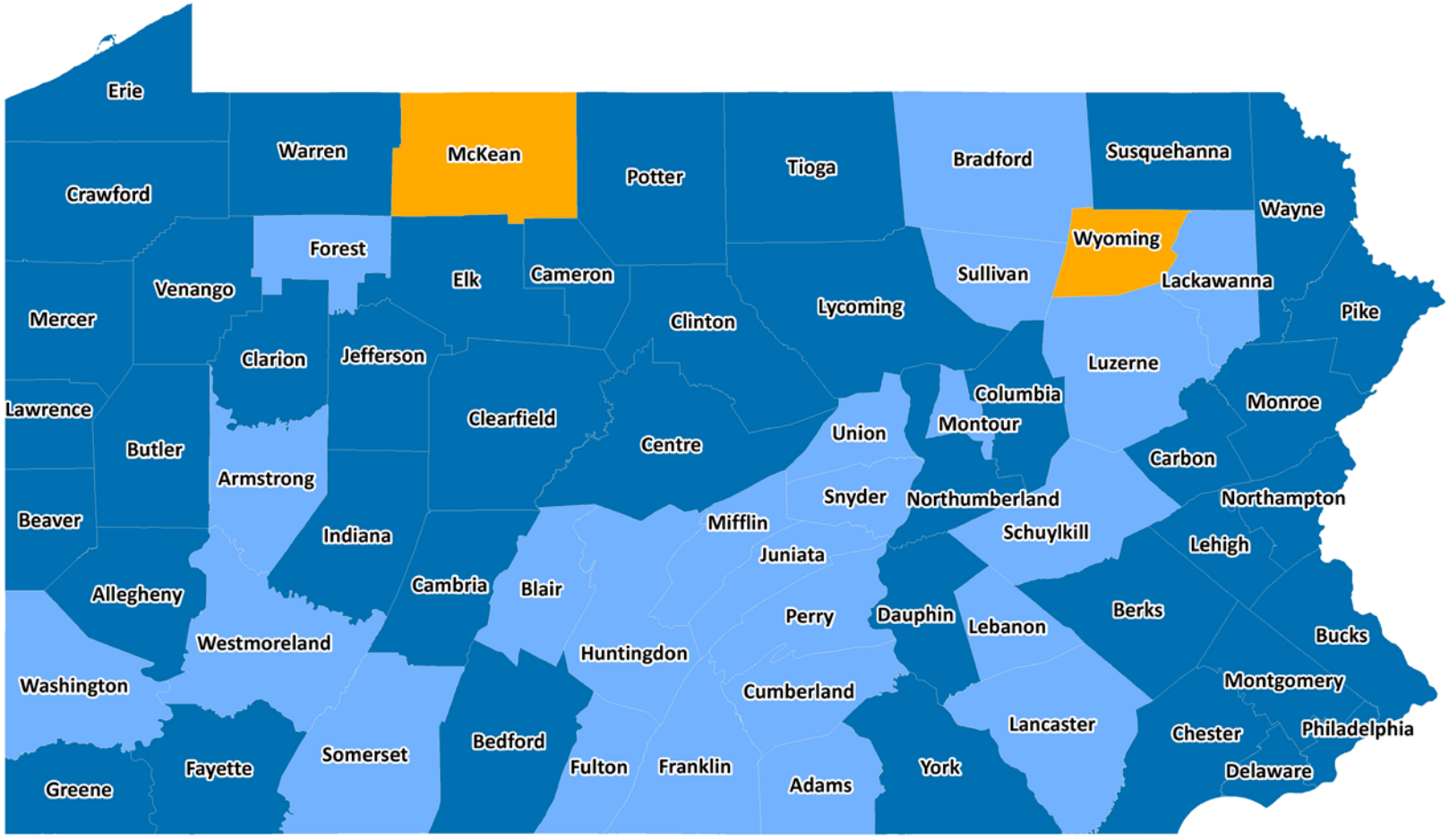
Collecting and analyzing this hazard data takes a significant amount of time and resources and can be particularly taxing on small, rural communities that may not have GIS capabilities.

Pennsylvania HMP Status Overview

Expired

Approved (update imminent)

Approved



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General Makeup of the Commonwealth

25%

URBAN

75%

RURAL

- Land Area = 44,000 mi^2
- Population = 12.7M
- More than 80,000 stream miles
- 73% of the population resides in urban counties
- So some Pennsylvania counties may have more deer than people…

Cost of Hazard Mitigation Plan Updates

- $40K - $50K (S)
- $50K - $75K (M)
- $100K (L)
- > $100K (Multi-County)

Funding Streams

Hazard Mitigation Grant Program (HMGP)

Flood Mitigation Assistance (FMA)

Pre-Disaster Mitigation (PDM)

Emergency Management Performance Grant (EPMG)

Options When Resources are Limited

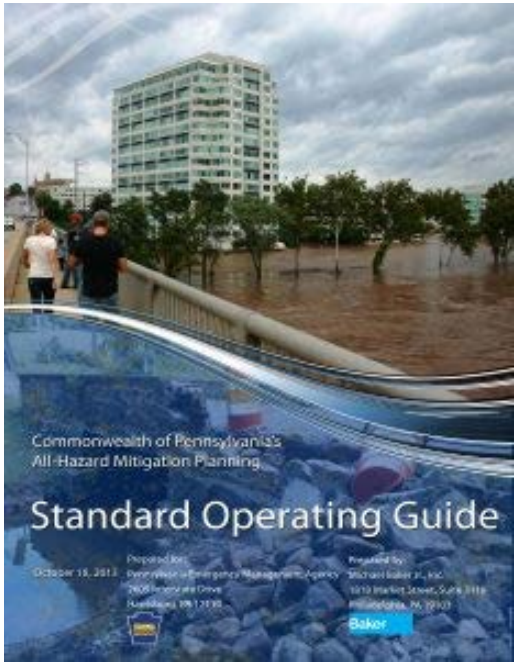
- Fortunately there is a vast amount of hazard and risk data available for communities with limited resources
- Much of this information is provided in tabular and/or mapped format which can be easily translated into a meaningful Risk Assessment, helping to guide effective mitigation

Pennsylvania Tools and Data Sources

Pennsylvania Hazard Mitigation Planning Standard Operating Guide (SOG)

The Pennsylvania Emergency Management Agency (PEMA) developed this guidance to streamline HM planning in PA and to ease the burden on local officials.

1. Condensed, targeted guidance
2. Model Plan Outline designed to ensure the requirements of a risk assessment are met
3. Questionnaires and evaluation checklists that assist with data and information collection



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PA SOG Cont.

4. Hazard Risk prioritization methodology to more easily and accurately assess risk and prioritize hazard mitigation efforts

PA Risk Factor Value =

[(Probability x .30) + (Impact x .30) + (Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

5. Includes Risk Assessment Hazard Data Sources Appendix which lists available data resources for numerous natural and human-made hazards

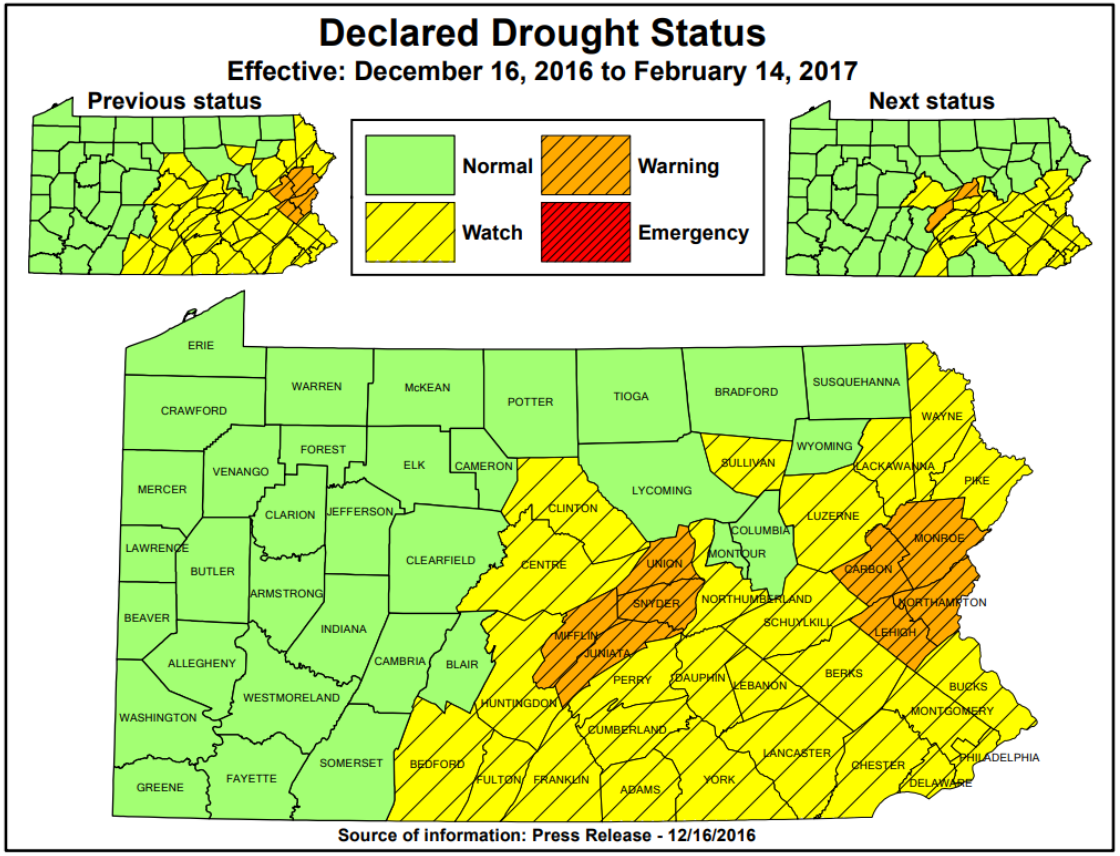
6. Next update will include Historic Preservation (may be of particular interest to small river town communities)

PA Data for Risk Assessments

PEMA's PA State HMP – Jurisdictional Risk Assessment and Vulnerability Analysis

PA Data for Risk Assessments

PA Department of Environmental Protection



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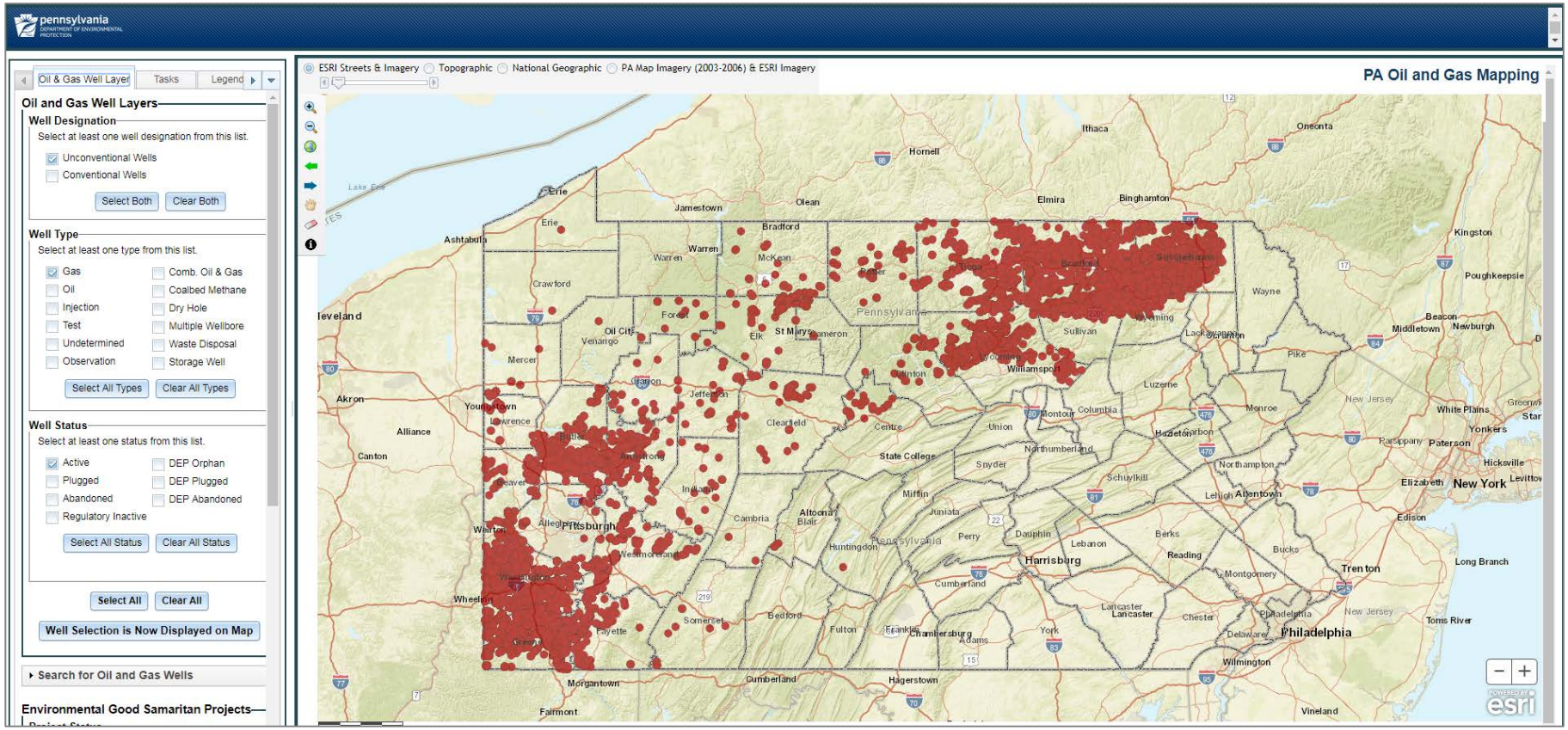

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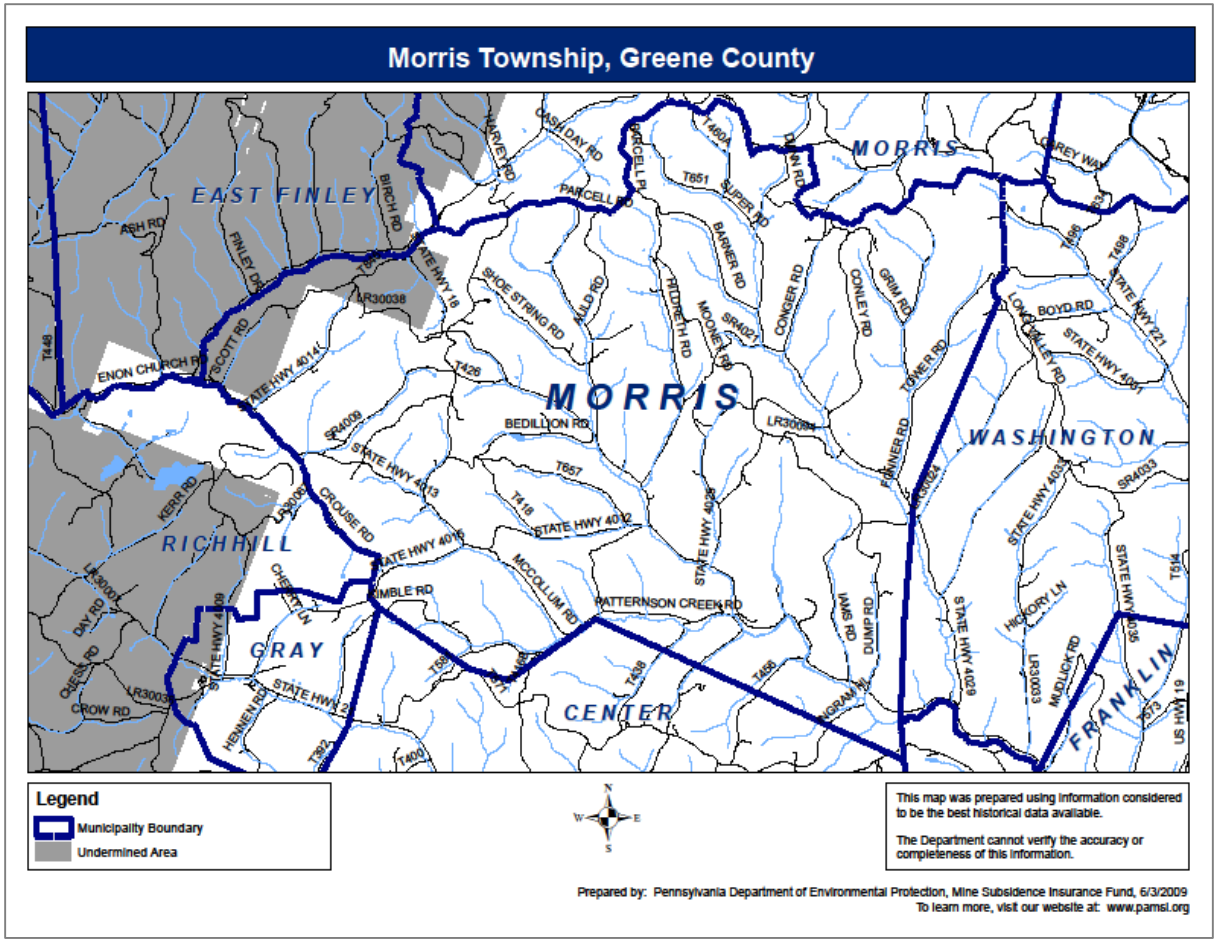

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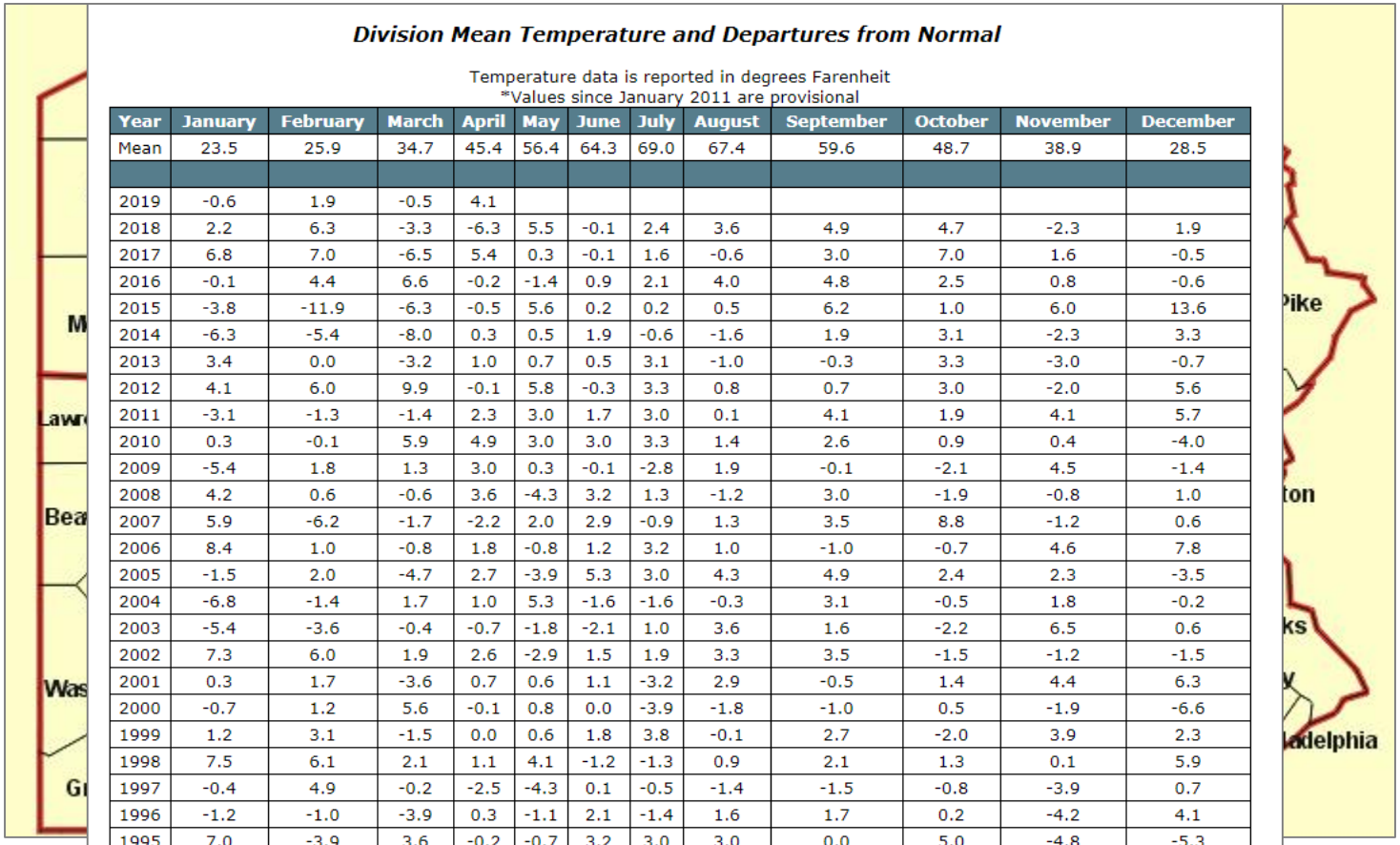
PA Data for Risk Assessments

Penn State Climatologist Program



Division Mean Temperature and Departures from Normal

Temperature data is reported in degrees Farenheit
*Values since January 2011 are provisional

Year	January	February	March	April	May	June	July	August	September	October	November	December
Mean	23.5	25.9	34.7	45.4	56.4	64.3	69.0	67.4	59.6	48.7	38.9	28.5
2019	-0.6	1.9	-0.5	4.1								
2018	2.2	6.3	-3.3	-6.3	5.5	-0.1	2.4	3.6	4.9	4.7	-2.3	1.9
2017	6.8	7.0	-6.5	5.4	0.3	-0.1	1.6	-0.6	3.0	7.0	1.6	-0.5
2016	-0.1	4.4	6.6	-0.2	-1.4	0.9	2.1	4.0	4.8	2.5	0.8	-0.6
2015	-3.8	-11.9	-6.3	-0.5	5.6	0.2	0.2	0.5	6.2	1.0	6.0	13.6
2014	-6.3	-5.4	-8.0	0.3	0.5	1.9	-0.6	-1.6	1.9	3.1	-2.3	3.3
2013	3.4	0.0	-3.2	1.0	0.7	0.5	3.1	-1.0	-0.3	3.3	-3.0	-0.7
2012	4.1	6.0	9.9	-0.1	5.8	-0.3	3.3	0.8	0.7	3.0	-2.0	5.6
2011	-3.1	-1.3	-1.4	2.3	3.0	1.7	3.0	0.1	4.1	1.9	4.1	5.7
2010	0.3	-0.1	5.9	4.9	3.0	3.0	3.3	1.4	2.6	0.9	0.4	-4.0
2009	-5.4	1.8	1.3	3.0	0.3	-0.1	-2.8	1.9	-0.1	-2.1	4.5	-1.4
2008	4.2	0.6	-0.6	3.6	-4.3	3.2	1.3	-1.2	3.0	-1.9	-0.8	1.0
2007	5.9	-6.2	-1.7	-2.2	2.0	2.9	-0.9	1.3	3.5	8.8	-1.2	0.6
2006	8.4	1.0	-0.8	1.8	-0.8	1.2	3.2	1.0	-1.0	-0.7	4.6	7.8
2005	-1.5	2.0	-4.7	2.7	-3.9	5.3	3.0	4.3	4.9	2.4	2.3	-3.5
2004	-6.8	-1.4	1.7	1.0	5.3	-1.6	-1.6	-0.3	3.1	-0.5	1.8	-0.2
2003	-5.4	-3.6	-0.4	-0.7	-1.8	-2.1	1.0	3.6	1.6	-2.2	6.5	0.6
2002	7.3	6.0	1.9	2.6	-2.9	1.5	1.9	3.3	3.5	-1.5	-1.2	-1.5
2001	0.3	1.7	-3.6	0.7	0.6	1.1	-3.2	2.9	-0.5	1.4	4.4	6.3
2000	-0.7	1.2	5.6	-0.1	0.8	0.0	-3.9	-1.8	-1.0	0.5	-1.9	-6.6
1999	1.2	3.1	-1.5	0.0	0.6	1.8	3.8	-0.1	2.7	-2.0	3.9	2.3
1998	7.5	6.1	2.1	1.1	4.1	-1.2	-1.3	0.9	2.1	1.3	0.1	5.9
1997	-0.4	4.9	-0.2	-2.5	-4.3	0.1	-0.5	-1.4	-1.5	-0.8	-3.9	0.7
1996	-1.2	-1.0	-3.9	0.3	-1.1	2.1	-1.4	1.6	1.7	0.2	-4.2	4.1
1995	7.0	-3.9	3.6	-0.2	-0.7	3.2	3.0	3.0	0.0	5.0	-4.8	-5.3
1994	-8.4	-3.9	-3.1	3.2	-0.8	3.5	3.9	-0.9	0.2	0.2	5.6	5.4

PA Data for Risk Assessments

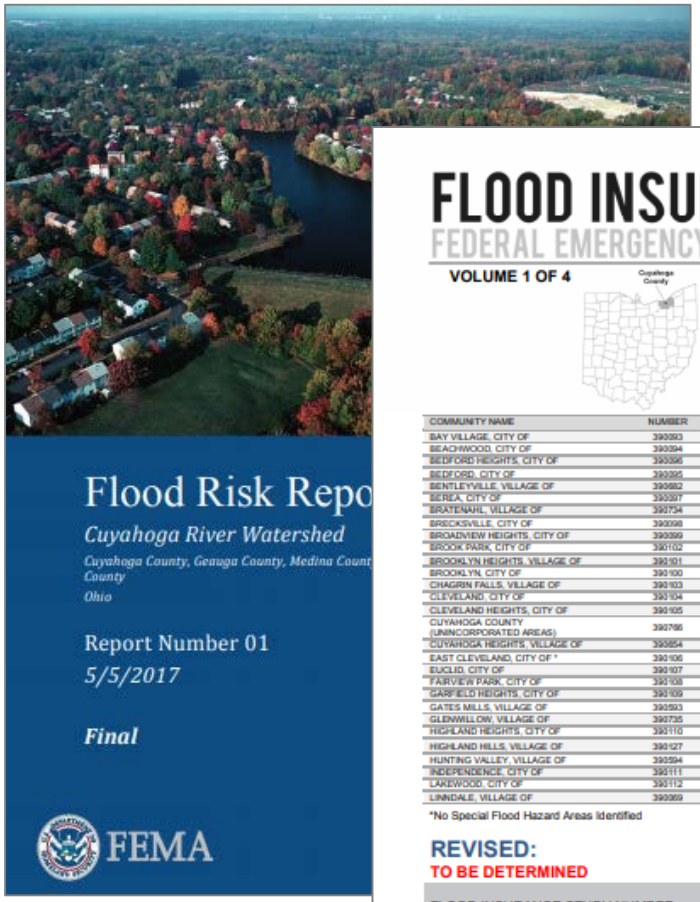
Pennsylvania Incident Management System

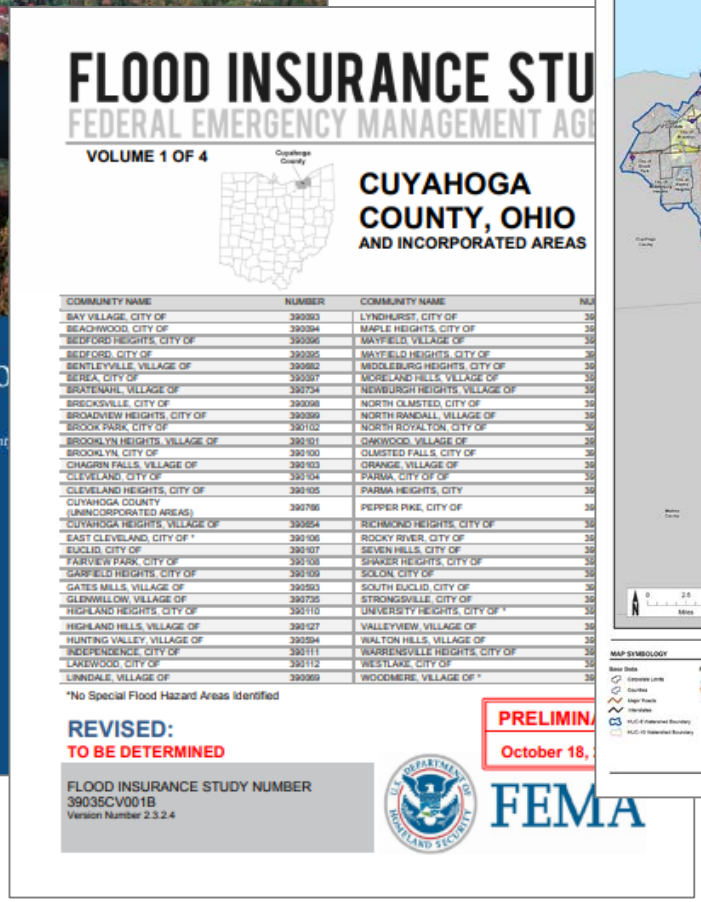
- Data for difficult-to-find human-made hazards
- Though not publicly available, county and local EMA staff have access
  - Pennsylvania Emergency Incident Reporting System (PEIRS) via various platforms [EIS GEM, WebEOC, Knowledge Center (KC)]

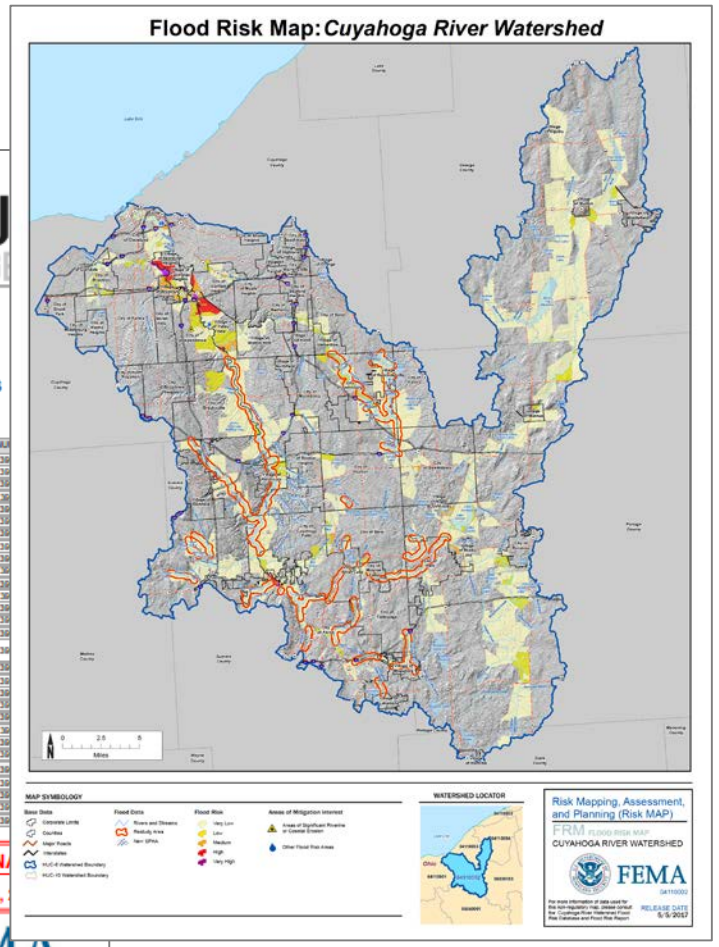
Federal Data Sources

Federal Data for Risk Assessments

FEMA Mapping Service Center







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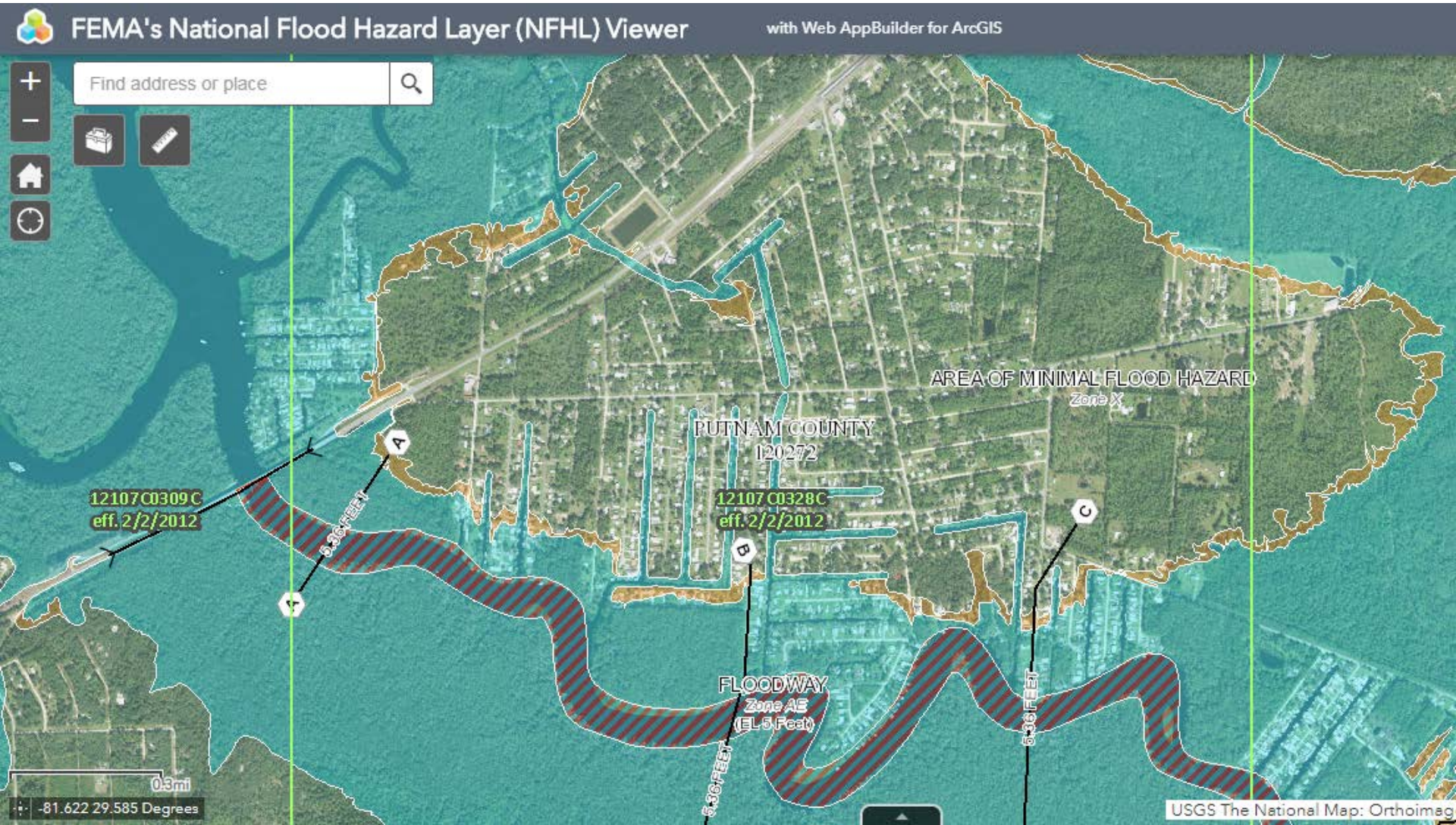
Federal Data for Risk Assessments

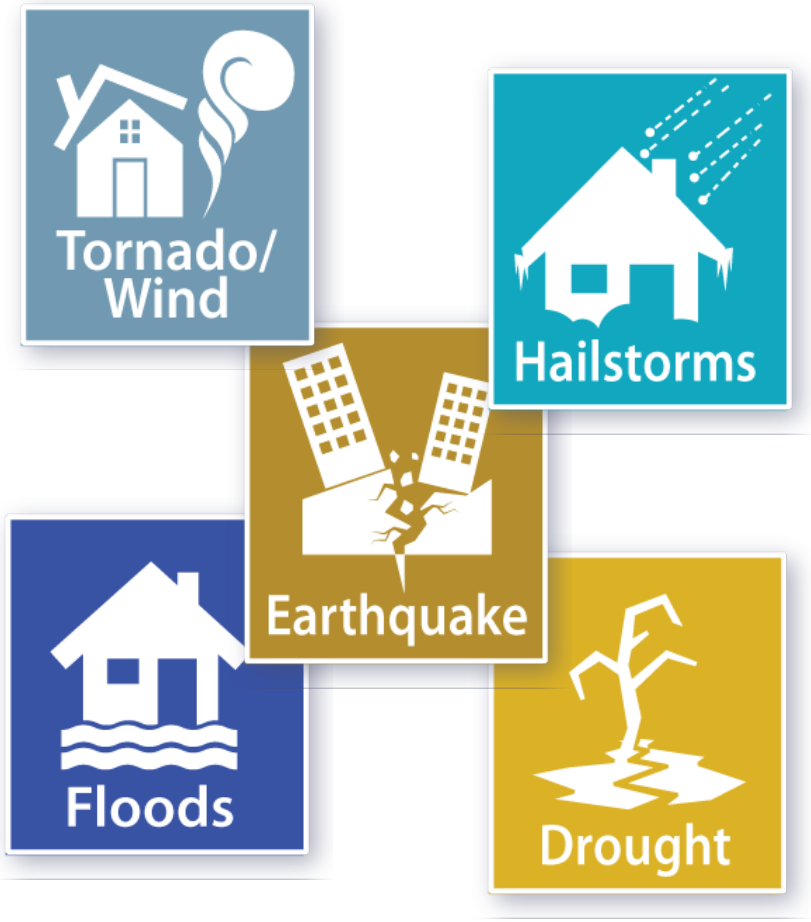
FEMA National Flood Hazard Layer Viewer



Federal Data for Risk Assessments

NOAA-National Centers for Environmental Information (NCEI)

- NCEI (formerly NCDC) is the world's largest provider of weather and climate data
- Tabular and/or mapped information on extreme weather events can be gathered by state and county for numerous natural hazards



Federal Data for Risk Assessments

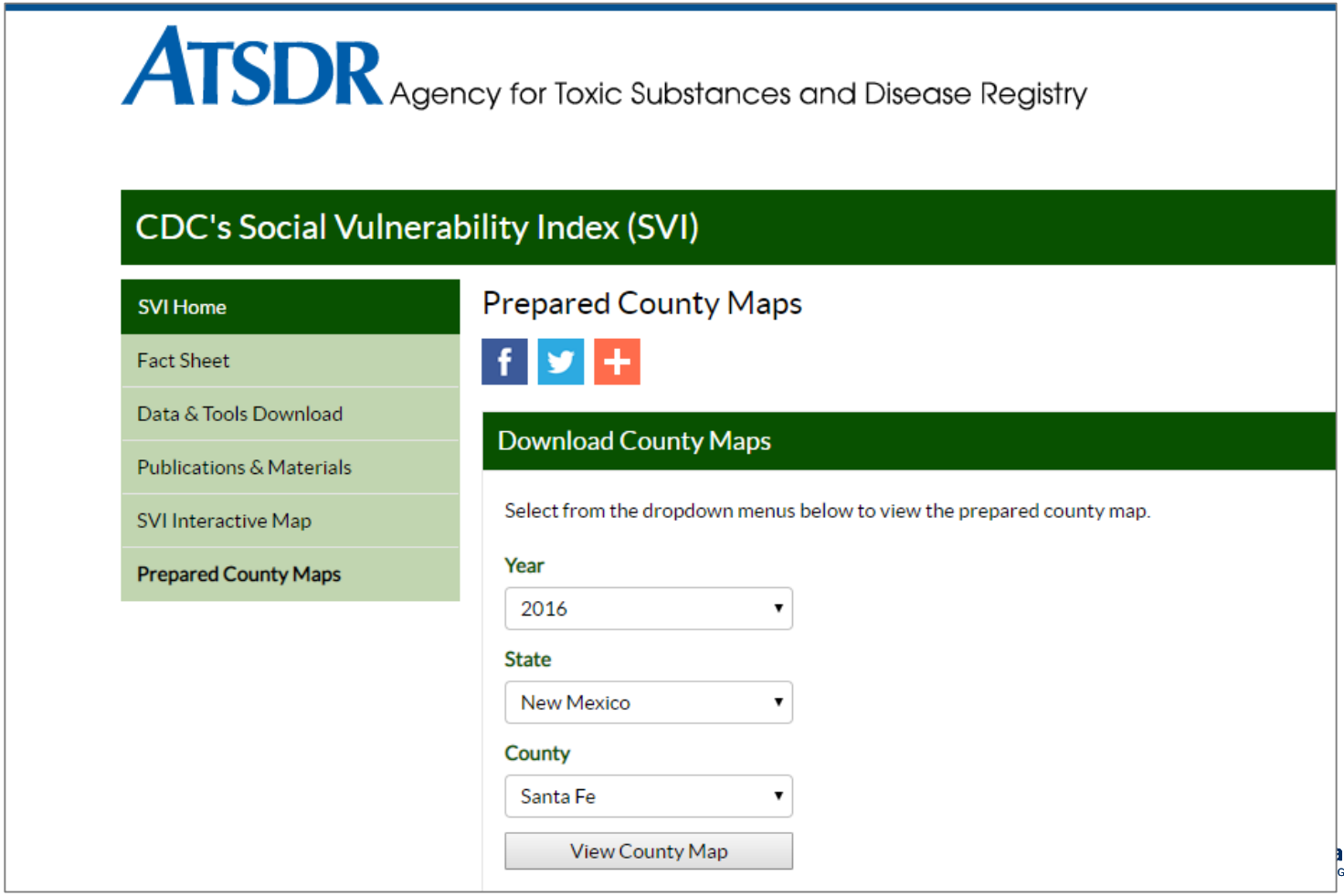
NOAA-National Centers for Environmental Information (NCEI)

Information for each event may include:

- Date
- Location specifics (jurisdiction or neighborhood)
- Description of impact
  - Damages
  - Injuries or deaths
  - Economic loss estimates

Federal Data for Risk Assessments

CDC-Agency for Toxic Substances and Disease Registry

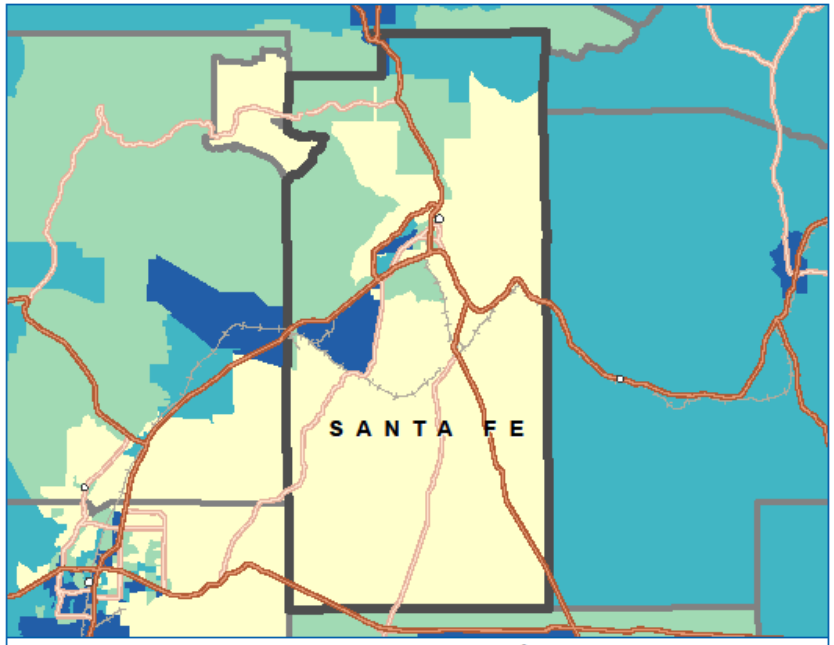


CDC's Social Vulnerability Index 2016

Santa Fe County, New Mexico

PART 1

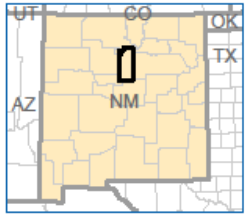
Overall Social Vulnerability[1]



Highest (Top 4th) | Vulnerability (SVI 2016)[2] | Lowest (Bottom 4th)

Data Unavailable[3]

0 3.25 6.5 13 19.5
Miles



Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills. The **Social Vulnerability Index (SVI 2016)[4] County Map** depicts the social vulnerability of communities, at census tract level, within a specified county. SVI 2016 groups **fifteen census-derived factors** into **four themes** that summarize the extent to which the area is socially vulnerable to disaster. The factors include economic data as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall Social Vulnerability combines all the variables to provide a comprehensive assessment.

MAP PRODUCED 2/27/2018

GRASP

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

ATSDR

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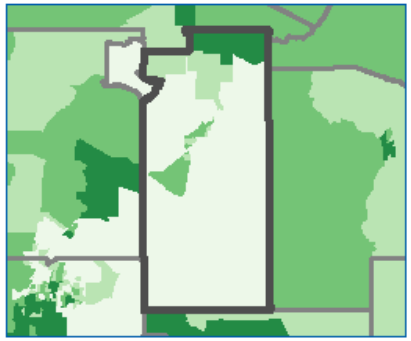
SVI 2016 – SANTA FE COUNTY, NEW MEXICO

PART 2

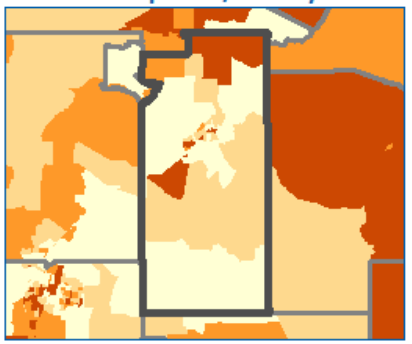
SVI Themes

Socioeconomic Status[5]



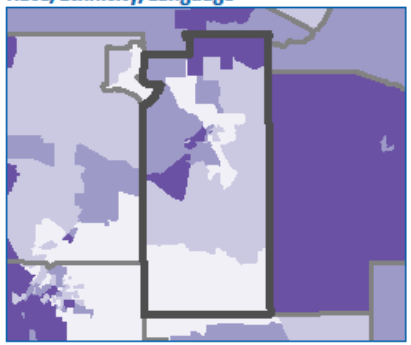
Highest (Top 4th) | Vulnerability (SVI 2016)[2] | Lowest (Bottom 4th)

Household Composition/Disability[6]



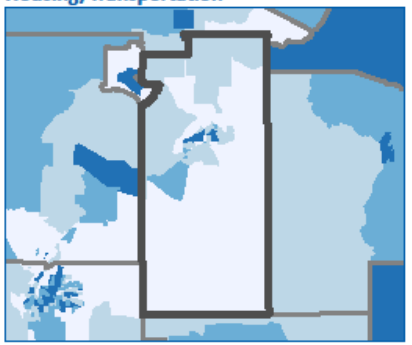
Highest (Top 4th) | Vulnerability (SVI 2016)[2] | Lowest (Bottom 4th)

Race/Ethnicity/Language[7]



Highest (Top 4th) | Vulnerability (SVI 2016)[2] | Lowest (Bottom 4th)

Housing/Transportation[8]



Highest (Top 4th) | Vulnerability (SVI 2016)[2] | Lowest (Bottom 4th)

Data Sources: [3]CDC/ATSDR/GRASP, U.S. Census Bureau, Esri® StreetMapTM Premium.
Notes: [4]Overall Social Vulnerability: All 15 variables. [5]Census tracts with 0 population. [6]The SVI combines percentile rankings of US Census American Community Survey (ACS) 2012-2016 variables, for the state, at the census tract level. [7]Socioeconomic Status: Poverty, Unemployed, Per Capita Income, No High School Diploma. [8]Household Composition/Disability: Aged 65 and Over, Aged 17 and Younger, Single-parent Household, Aged 5 and over with a Disability. [9]Race/Ethnicity/Language: Minority, English Language Ability. [10]Housing/Transportation: Multi-unit, Mobile Homes, Crowding, No Vehicle, Group Quarters.
Projection: New Mexico NAD 1983 UTM Zone 13N, CM shifted to -106.
References: Flanagan, B.E., et al., A Social Vulnerability Index for Disaster Management. *Journal of Homeland Security and Emergency Management*, 2011. 8(1).
CDC's SVI web page: http://svi.cdc.gov

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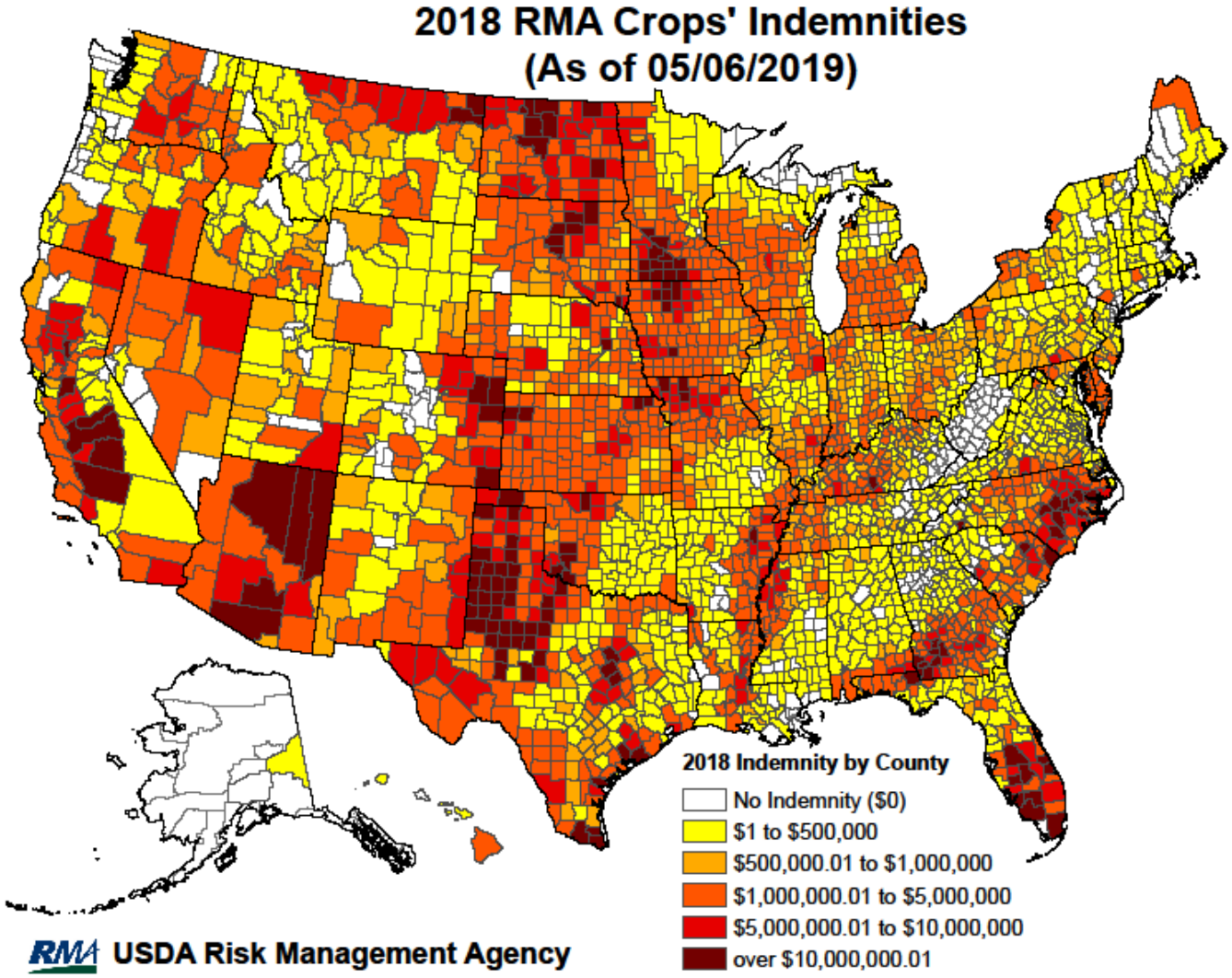
Federal Data for Risk Assessments

U.S. Department of Agriculture



Federal Data for Risk Assessments

U.S. Department of Agriculture

Table 1. **County Summary Highlights: 2017** (continued)

[For meaning of abbreviations and symbols, see introductory text.]

Item		Garfield	Grant	Grays Harbor	Island	Jefferson	King	Kitsap
Farms	number	226	1,384	469	390	221	1,796	698
Land in farms	acres	289,848	1,041,582	105,233	15,850	13,753	41,975	9,391
Average size of farm	acres	1,283	753	224	41	62	23	13
Median size of farm	acres	355	144	29	15	24	9	7
Estimated market value of land and buildings:								
Average per farm	dollars	2,017,792	2,574,272	537,286	446,211	473,659	823,790	473,099
Average per acre	dollars	1,573	3,421	2,395	10,979	7,611	35,248	35,164
Estimated market value of all machinery and equipment	$1,000	44,374	619,191	39,642	16,686	9,154	69,416	23,113
Average per farm	dollars	196,343	447,392	84,525	42,783	41,419	38,650	33,113
Farms by size:								
1 to 9 acres		6	228	102	113	48	962	444
10 to 49 acres		44	271	203	213	92	710	228
50 to 179 acres		38	252	124	42	64	87	21
180 to 499 acres		37	231	24	19	14	30	5
500 to 999 acres		29	142	7	3	3	5	-
1,000 acres or more		72	260	9	-	-	2	-
Total cropland	farms	182	1,107	302	274	154	1,025	373
	acres	182,849	800,870	17,112	6,877	3,715	18,691	2,310
Harvested cropland	farms	137	962	256	245	129	840	300
	acres	103,293	568,572	14,606	5,725	2,962	12,701	1,655
Irrigated land	farms	37	1,065	121	148	72	466	245
	acres	969	448,040	6,274	1,911	1,048	4,102	465
Market value of agricultural products sold (see text)	$1,000	37,151	1,938,897	33,598	12,002	9,251	135,464	6,605
Average per farm	dollars	164,383	1,400,937	71,637	30,774	41,861	75,425	9,463
Crops, including nursery and greenhouse crops	$1,000	31,836	1,479,604	17,570	2,986	2,153	90,640	4,836
Livestock, poultry, and their products	$1,000	5,315	459,292	16,027	9,016	7,098	44,824	1,769
Farms by value of sales:								
Less than $2,500		82	332	213	167	96	1,025	438
$2,500 to $4,999		20	62	80	78	32	197	68
$5,000 to $9,999		9	86	53	59	37	203	85
$10,000 to $24,999		18	66	50	46	24	157	51
$25,000 to $49,999		5	80	28	16	16	73	34
$50,000 to $99,999		10	76	13	12	6	57	10
$100,000 or more		82	682	32	12	10	84	12
Government payments (see text)	farms	160	403	10	19	19	46	4
	$1,000	5,997	13,885	62	85	30	760	(D)
Total income from farm-related sources	farms	126	640	123	137	39	428	132
	$1,000	3,859	48,436	7,049	1,242	664	11,618	3,161

These are just a few of the great resources available at the state and federal level.

Including a broad range of stakeholders in the planning process will also assist communities with data collection and risk assessment!

Questions?

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