Turning up the Heat: Tools for Understanding, Exploring, and Reducing Wildfire Risks

HEADWATERS ECONOMICS

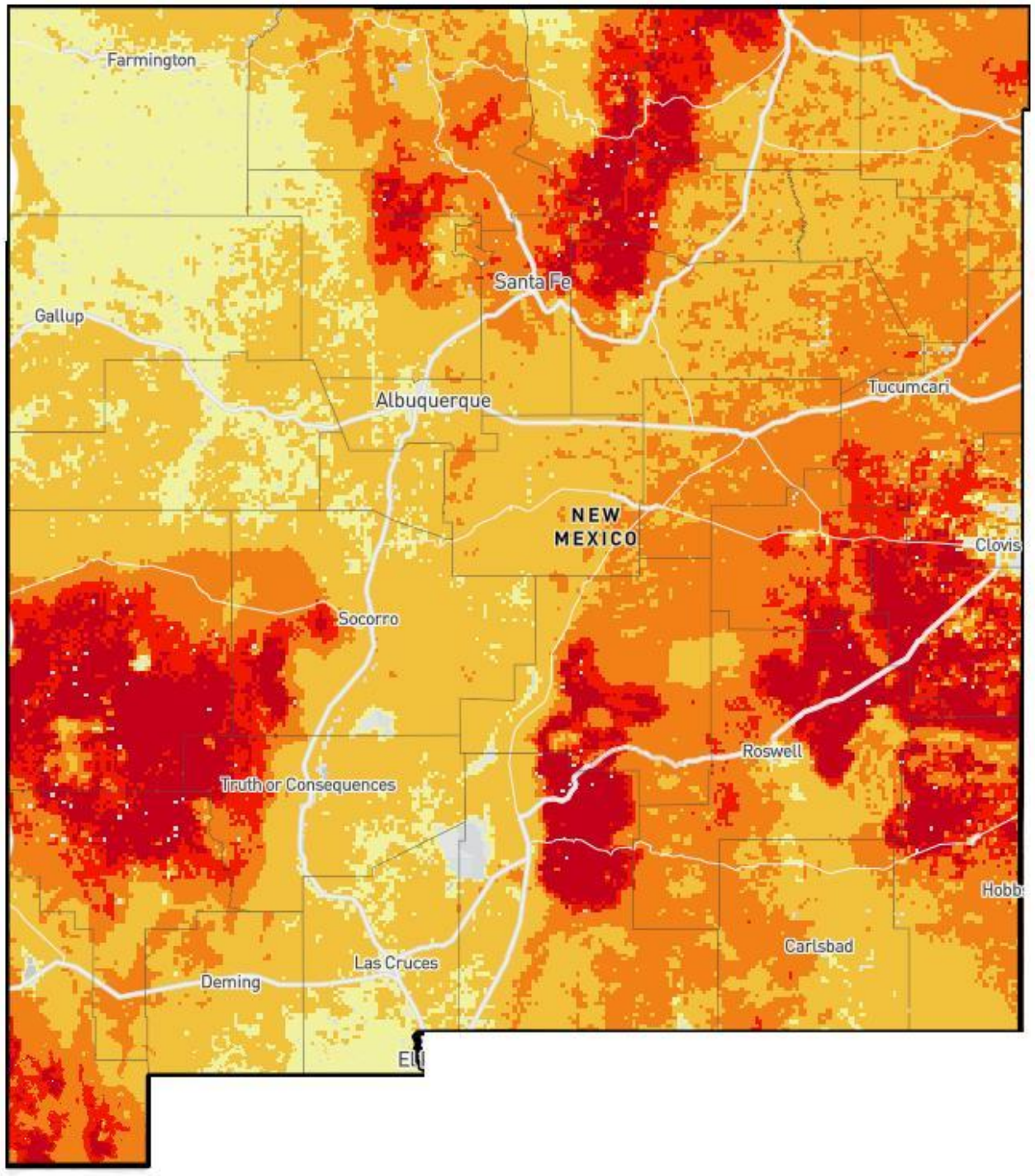
Kimiko Barrett, Ph.D.

Wildfire Researcher & Policy Lead

October 28, 2021

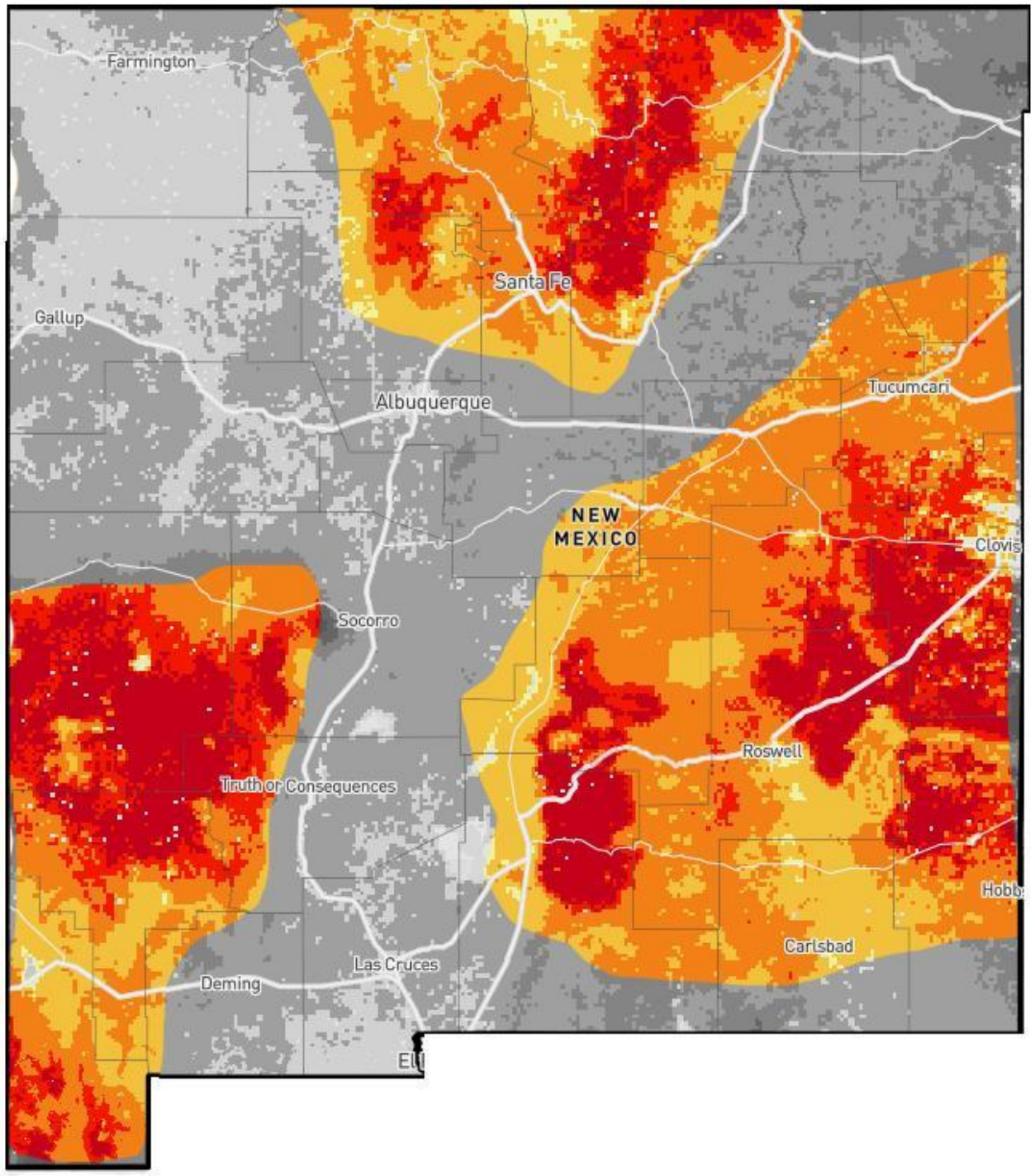
Question:

How many people living in medium – very high wildfire risk areas in New Mexico?

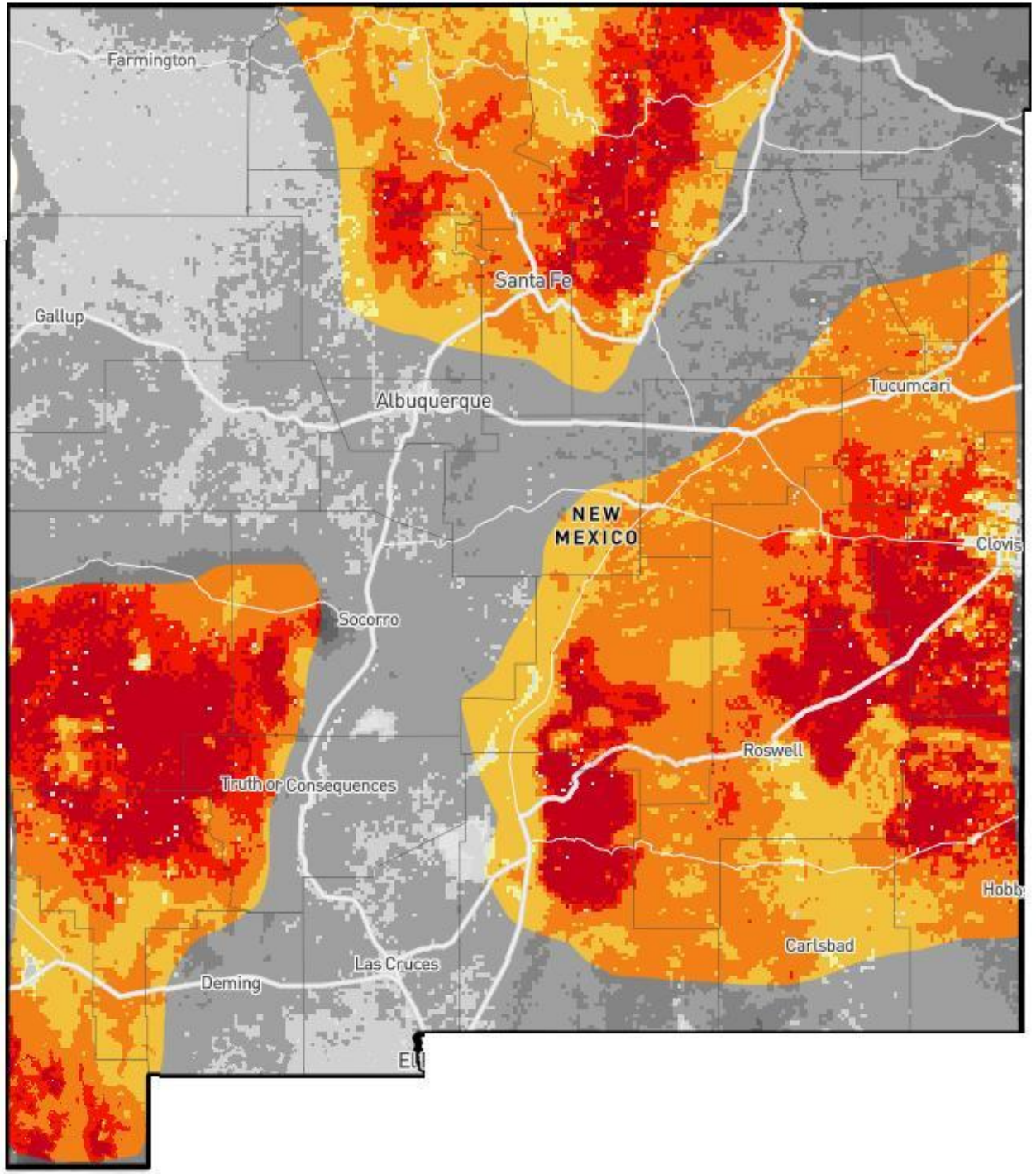


563,585:

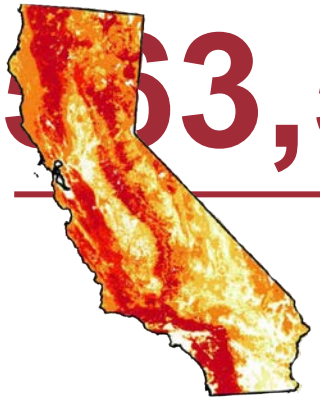
People living in medium – very high wildfire risk areas in New Mexico.



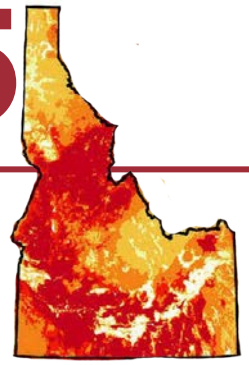
563,585:


Farmington
Santa Fe
Gallup
Albuquerque
Tucumcari
NEW
MEXICO
Clovis
Socorro
Roswell
Truth or Consequences
Carlsbad
Las Cruces
Deming

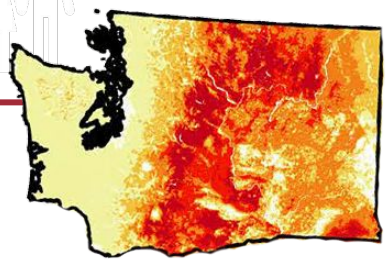
63,585



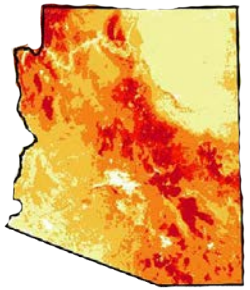
26M
California



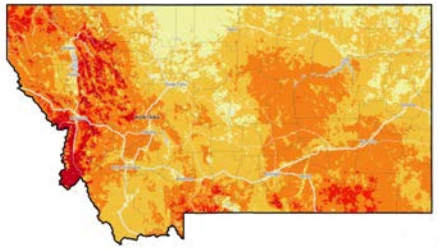
827K
Idaho



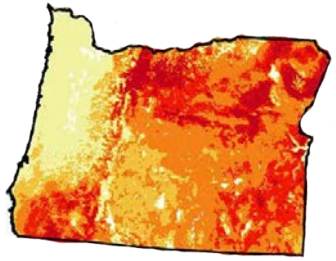
1.8M
Washington



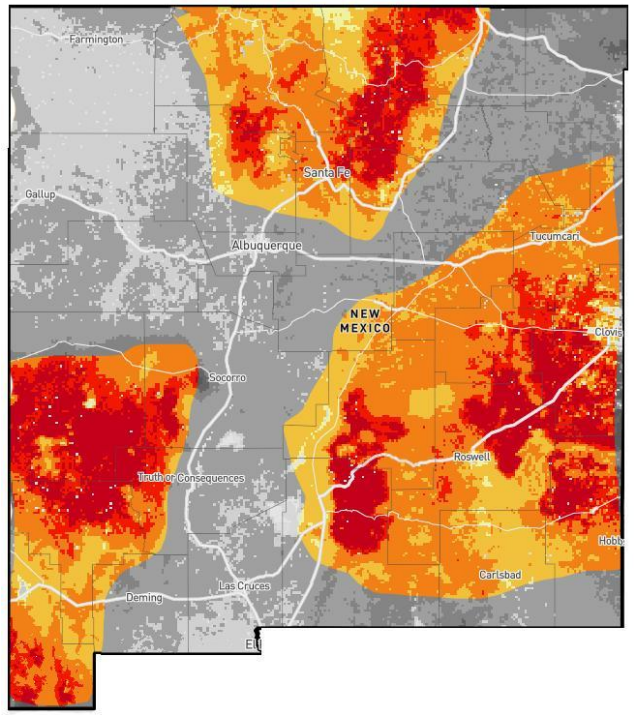
2M
Arizona

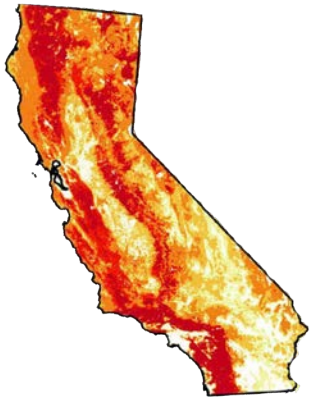


703K
Montana

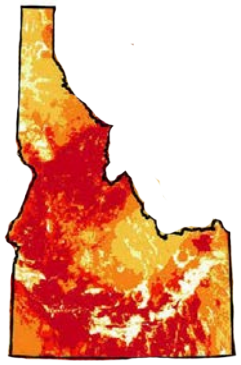


957K
Oregon

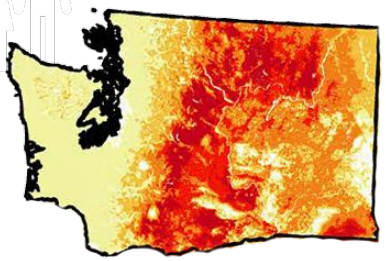




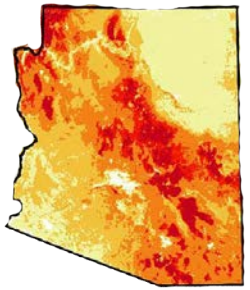
66%
California



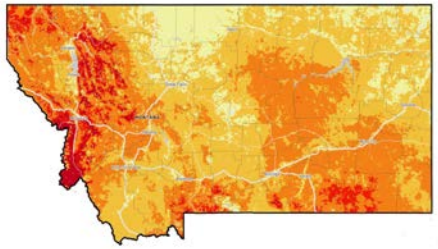
48%
Idaho



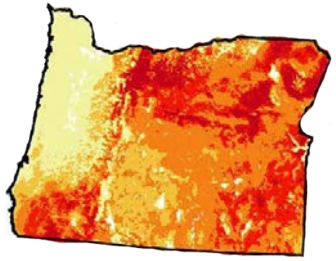
24%
Washington



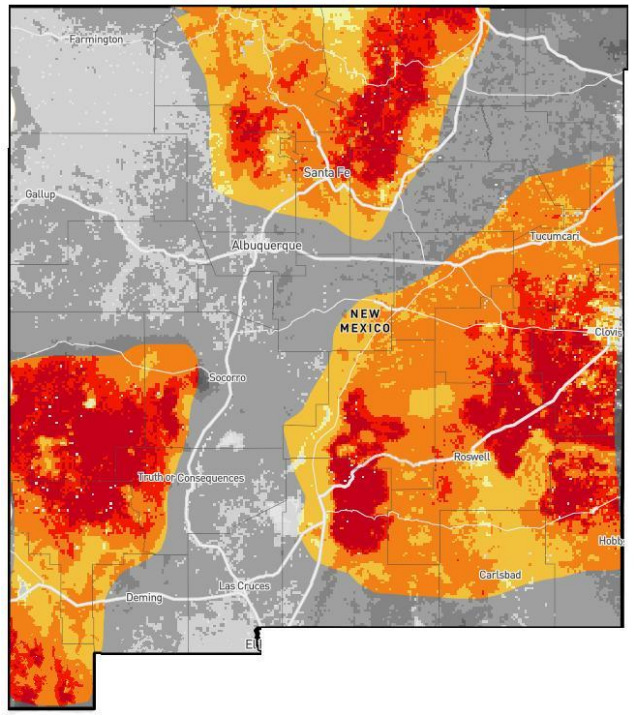
28%
Arizona



67%
Montana



23%
Oregon



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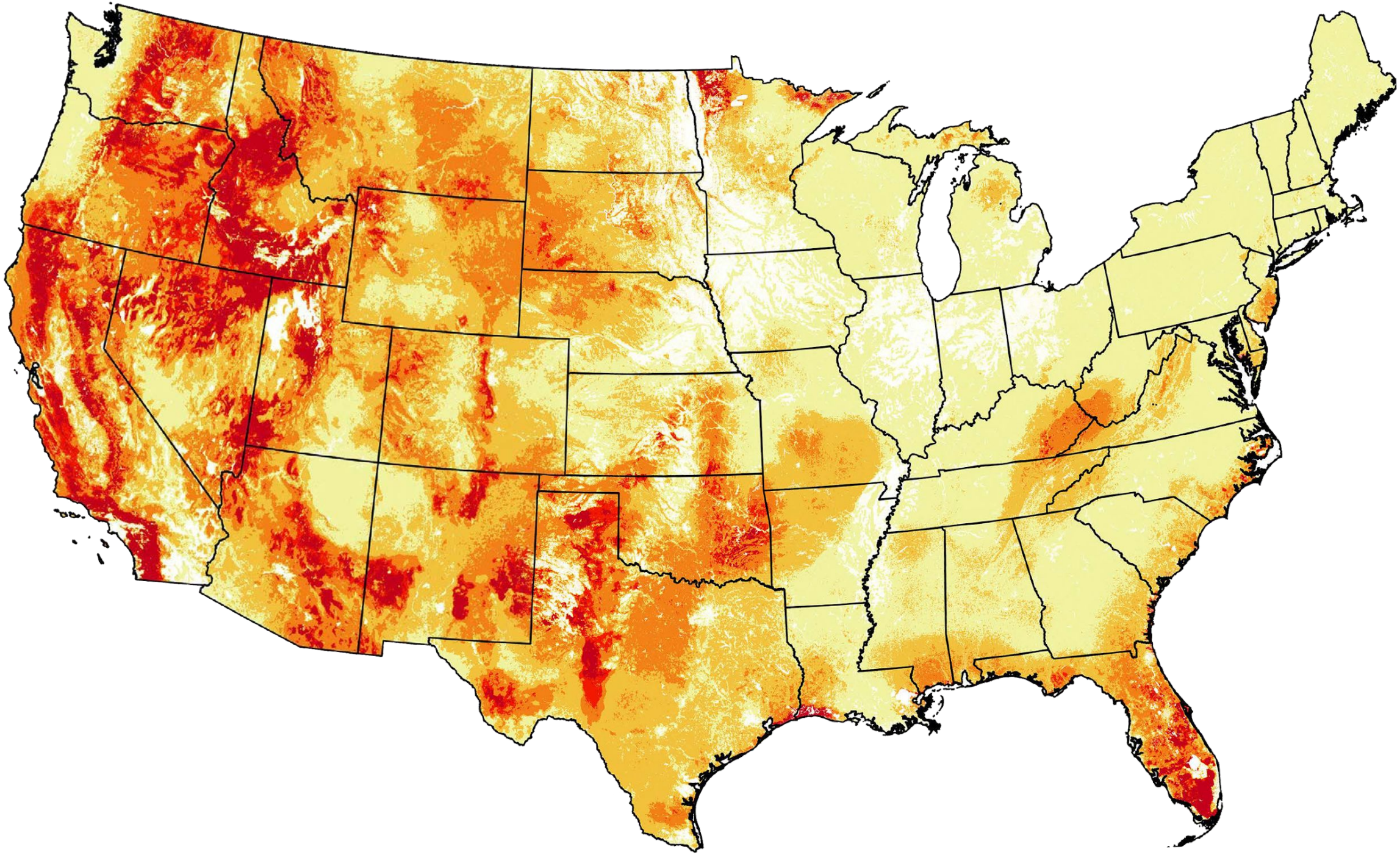


HEADWATERS ECONOMICS

Independent Nonpartisan Research

Context

Risks & Trends

Tools for Decision Makers

Context

Risks & Trends

Tools for Decision Makers

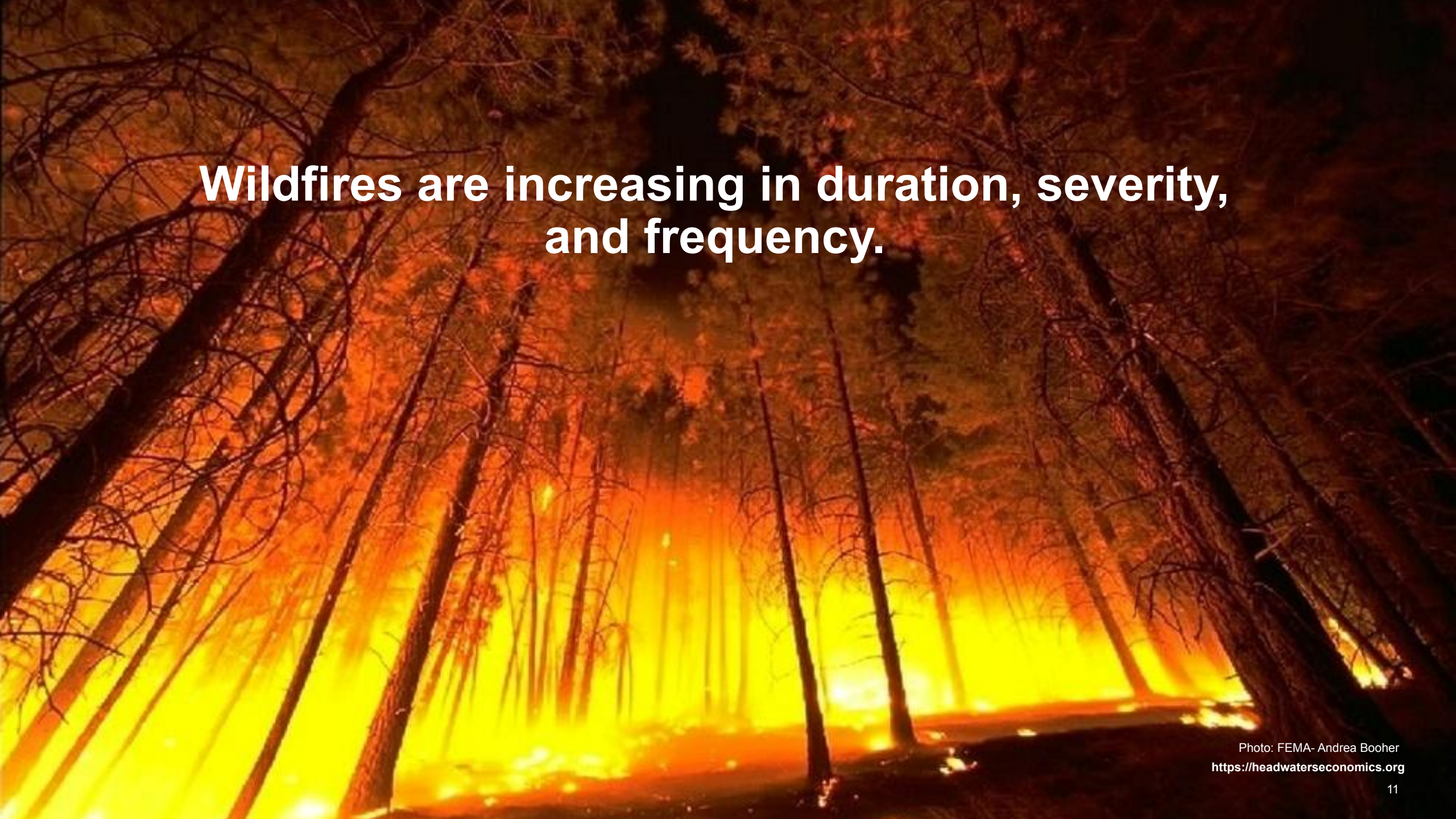


Photo: FEMA- Andrea Booher

https://headwaterseconomics.org

More homes are being built in fire-prone lands, increasing risk and cost.


+84 days
Longer wildfire season in U.S.
+20%
Extension across the globe


+700%
Acres burned from highly severe wildfires from 1985-2017

75%

Of forests in the western U.S. have become significantly drier


34%
Of single-family homes in the U.S. are located in the wildland-urban interface


100K
Structures burned since 2005
1.1K
Structures burned in New Mexico


$65.1 M
Suppression cost per wildfire, doubling firefighter costs since 1999

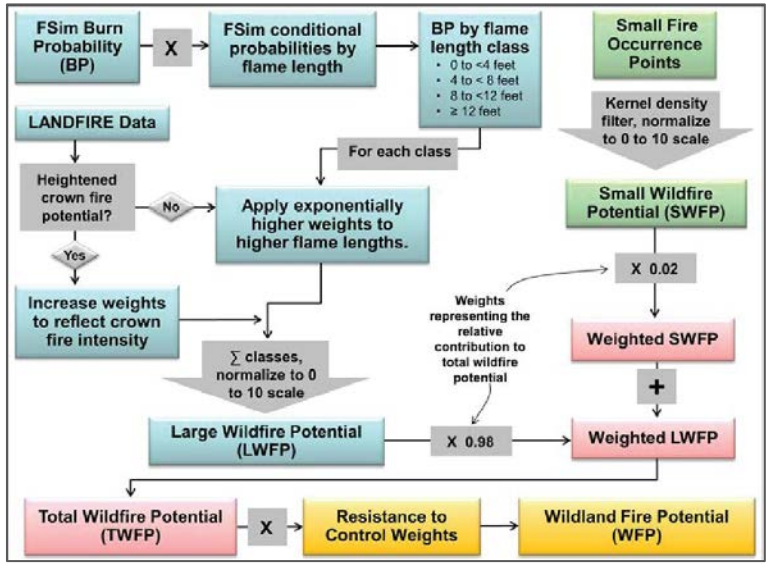
The problem is likely to get worse in the future.

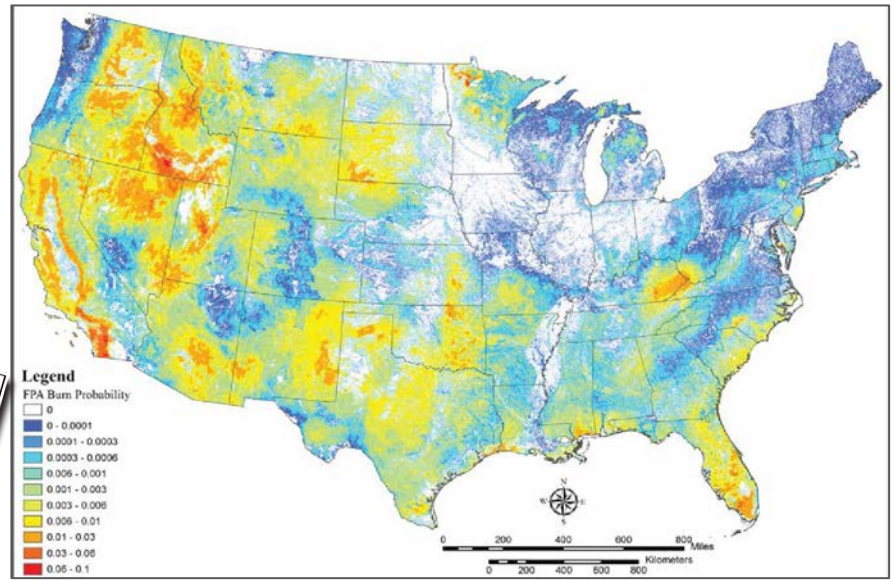
Context

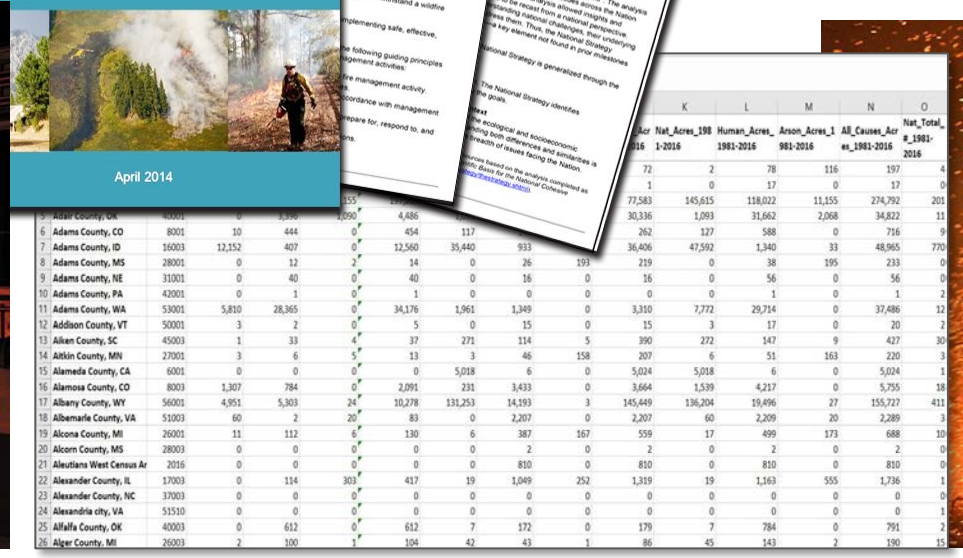
Risks & Trends

Tools for Decision Makers

Translating Wildfire Science

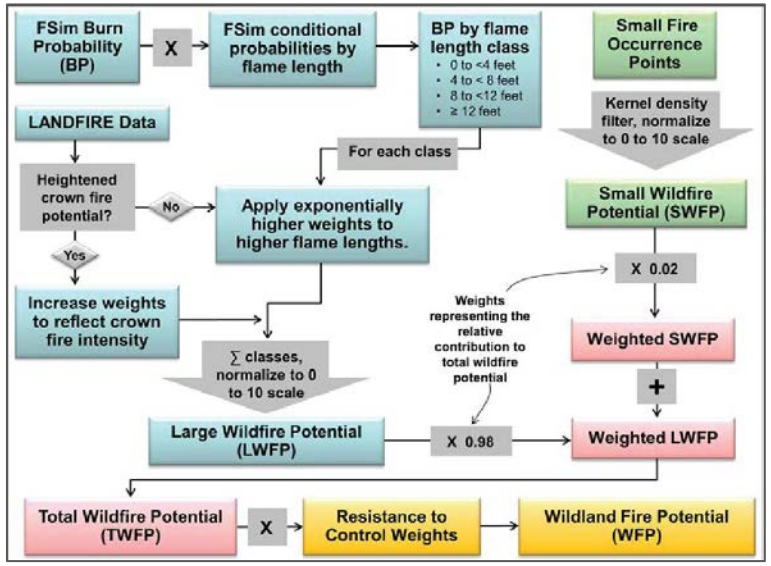


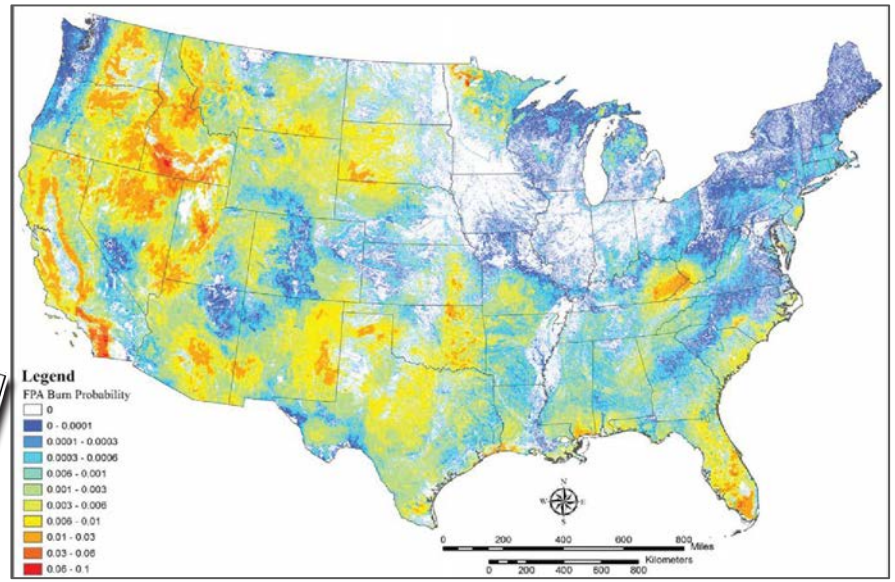


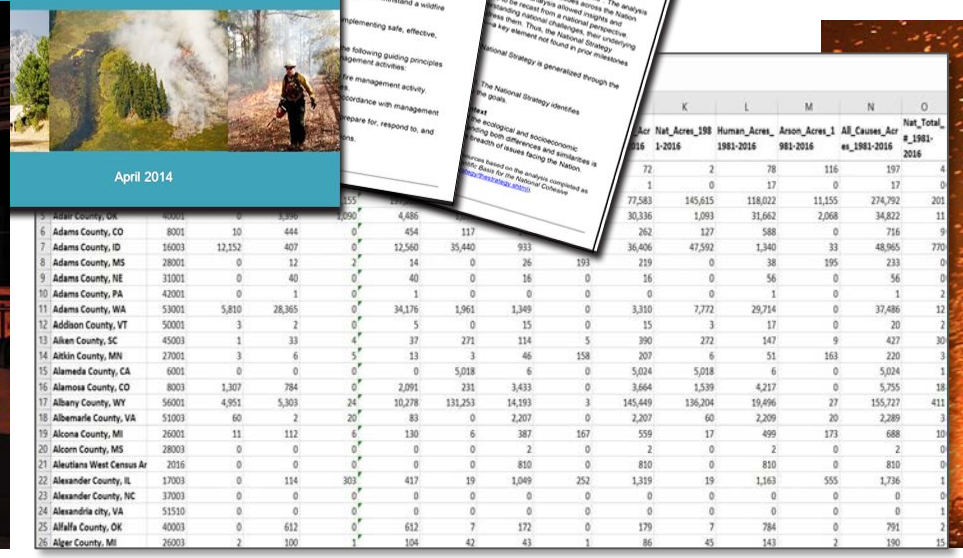


6	Adams County, CO	8001	10	444	0	454	117			262	127	588	0	716	9
7	Adams County, ID	16003	12,152	407	0	12,560	35,440	933		36,406	47,592	1,340	33	48,965	770
8	Adams County, MS	28001	0	12	2	14	0	26	193	219	0	38	195	233	0
9	Adams County, NE	31001	0	40	0	40	0	16	0	16	0	56	0	56	0
10	Adams County, PA	42001	0	1	0	1	0	0	0	0	0	1	0	1	2
11	Adams County, WA	53001	5,810	28,365	0	34,176	1,961	1,349	0	3,310	7,772	29,714	0	37,486	12
12	Addison County, VT	50001	3	2	0	5	0	15	0	15	3	17	0	20	2
13	Aiken County, SC	45003	1	33	4	37	271	114	5	390	272	147	9	427	30
14	Aitkin County, MN	27001	3	6	5	13	3	46	158	207	6	51	163	220	3
15	Alameda County, CA	6001	0	0	0	0	5,018	6	0	5,024	5,018	6	0	5,024	1
16	Alamosa County, CO	8003	1,307	784	0	2,091	231	3,433	0	3,664	1,539	4,217	0	5,755	18
17	Albany County, WY	56001	4,951	5,303	24	10,278	131,253	14,193	3	145,449	136,204	19,496	27	155,727	411
18	Albemarle County, VA	51003	60	2	20	83	0	2,207	0	2,207	60	2,209	20	2,289	3
19	Alcona County, MI	26001	11	112	6	130	6	387	167	559	17	499	173	688	10
20	Alcorn County, MS	28003	0	0	0	0	0	2	0	2	0	2	0	2	0
21	Aleutians West Census Ar	2016	0	0	0	0	0	810	0	810	0	810	0	810	0
22	Alexander County, IL	17003	0	114	303	417	19	1,049	252	1,319	19	1,163	555	1,736	1
23	Alexander County, NC	37003	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Alexandria city, VA	51510	0	0	0	0	0	0	0	0	0	0	0	0	1
25	Alfalfa County, OK	40003	0	612	0	612	7	172	0	179	7	784	0	791	2
26	Alger County, MI	26003	2	100	1	104	42	43	1	86	45	143	2	190	15

Translating Wildfire Science







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Translating Wildfire Science

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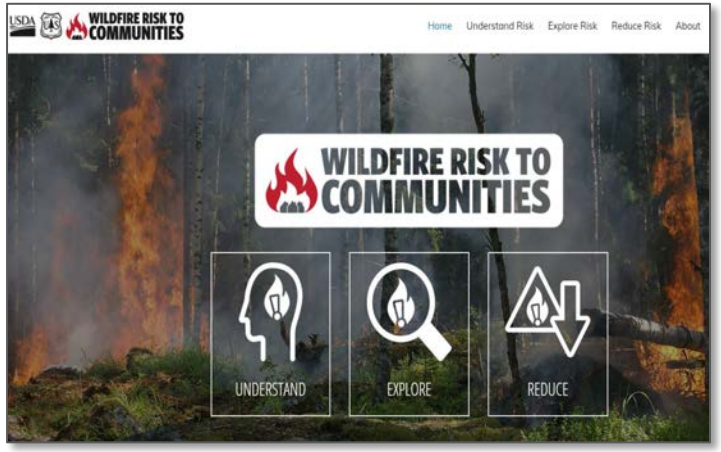
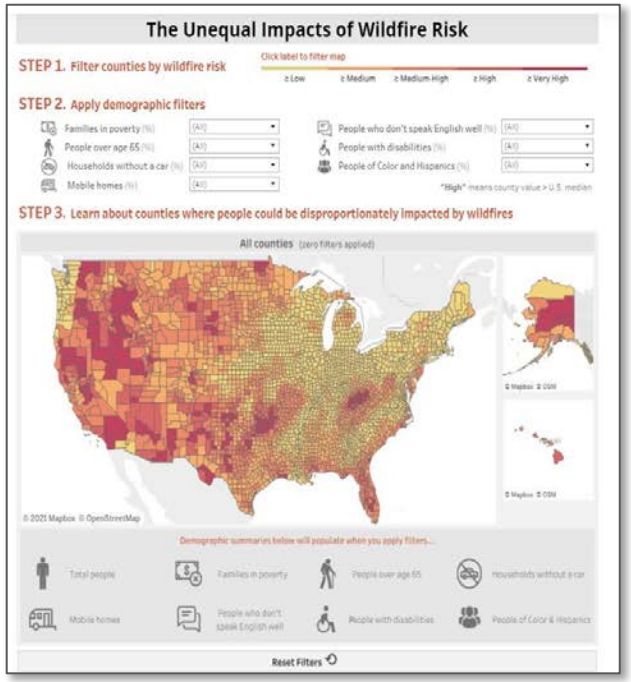
Interactive Tools for Wildfire Risks

WILDFIRE RISK TO COMMUNITIES





Interactive Tools for Wildfire Risks

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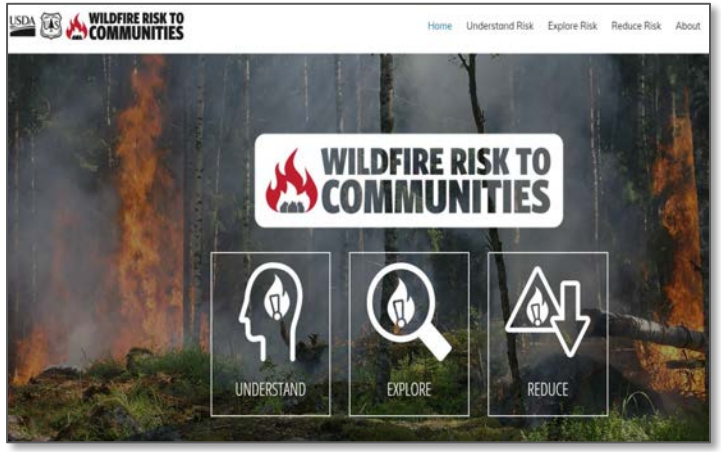

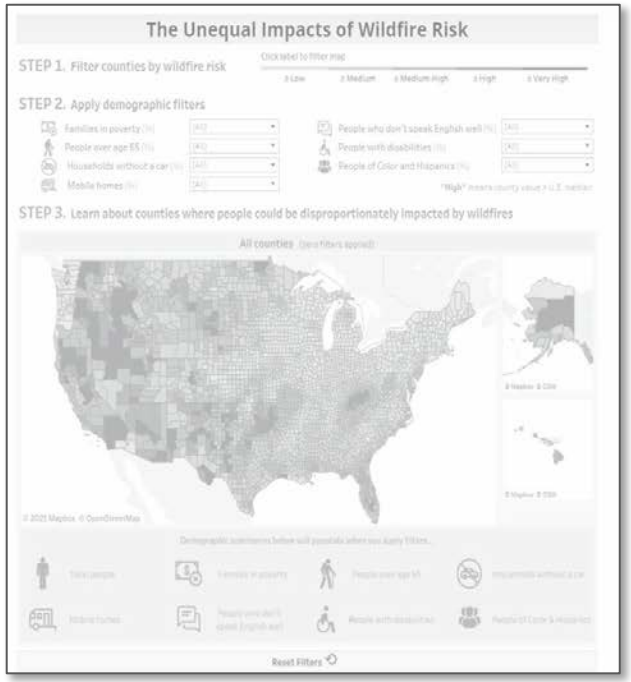


WILDFIRE RISK TO COMMUNITIES
USDA
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE
HEADWATERS ECONOMICS
PYROLOGIX

WILDFIRE RISK TO COMMUNITIES

UNDERSTAND

EXPLORE

REDUCE

WILDFIRE RISK TO COMMUNITIES

wildfirerisk.org

- Directed by Congress in 2018
- Interactive, nationwide maps, charts, & data with consistent methods
- Searchable by community, county, state

Audience and Goals

To help communities answer questions about wildfire risk.

- ✔ **Prioritize mitigation efforts**
- ✔ **Identify communities where localized efforts needed**
- ✔ **Find resources to mitigate risk**

Wildfire Risk to Communities is a free, easy-to-use website with interactive maps, charts, and resources to help communities understand, explore, and reduce wildfire risk. It was created by the USDA Forest Service under the direction of Congress and is designed to help community leaders, such as elected officials, community

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Homepage - Wildfire Risk to Com

wildfirerisk.org

USDA WILDFIRE RISK TO COMMUNITIES

Home | Understand Risk | Explore Risk | Reduce Risk | About | Download | Contact

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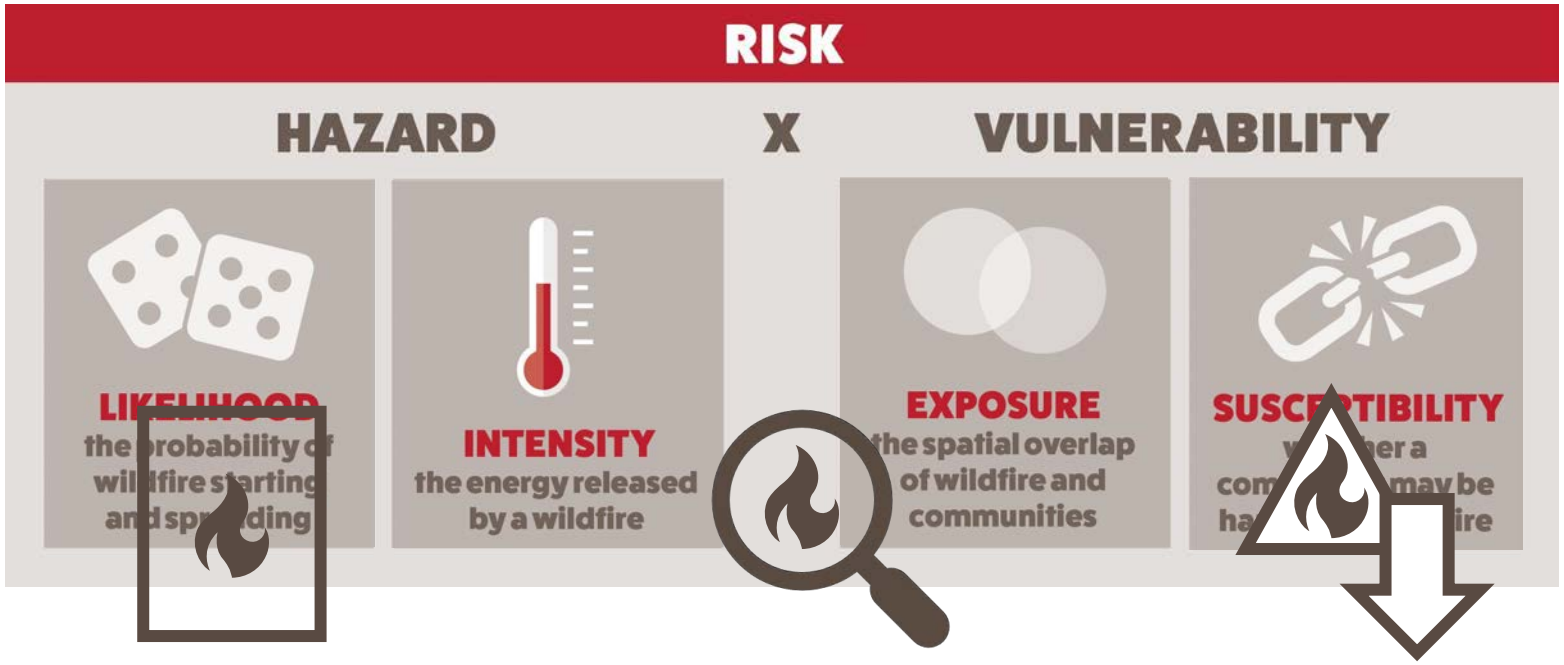
Understanding Risk



DESCRIPTION

EXPLORE

REDUC
E

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Reduce Risk


HOME
IGNITION ZONE


HOME
HARDENING


LAND USE
PLANNING


WILDFIRE
PREPAREDNESS


COMMUNITY
HEALTH


SMOKEY
WILDFIRE
PREVENTION


WILDFIRE
RESPONSE


FUEL
TREATMENTS


POST-FIRE
RECOVERY

Homepage - Wildfire Risk to Com

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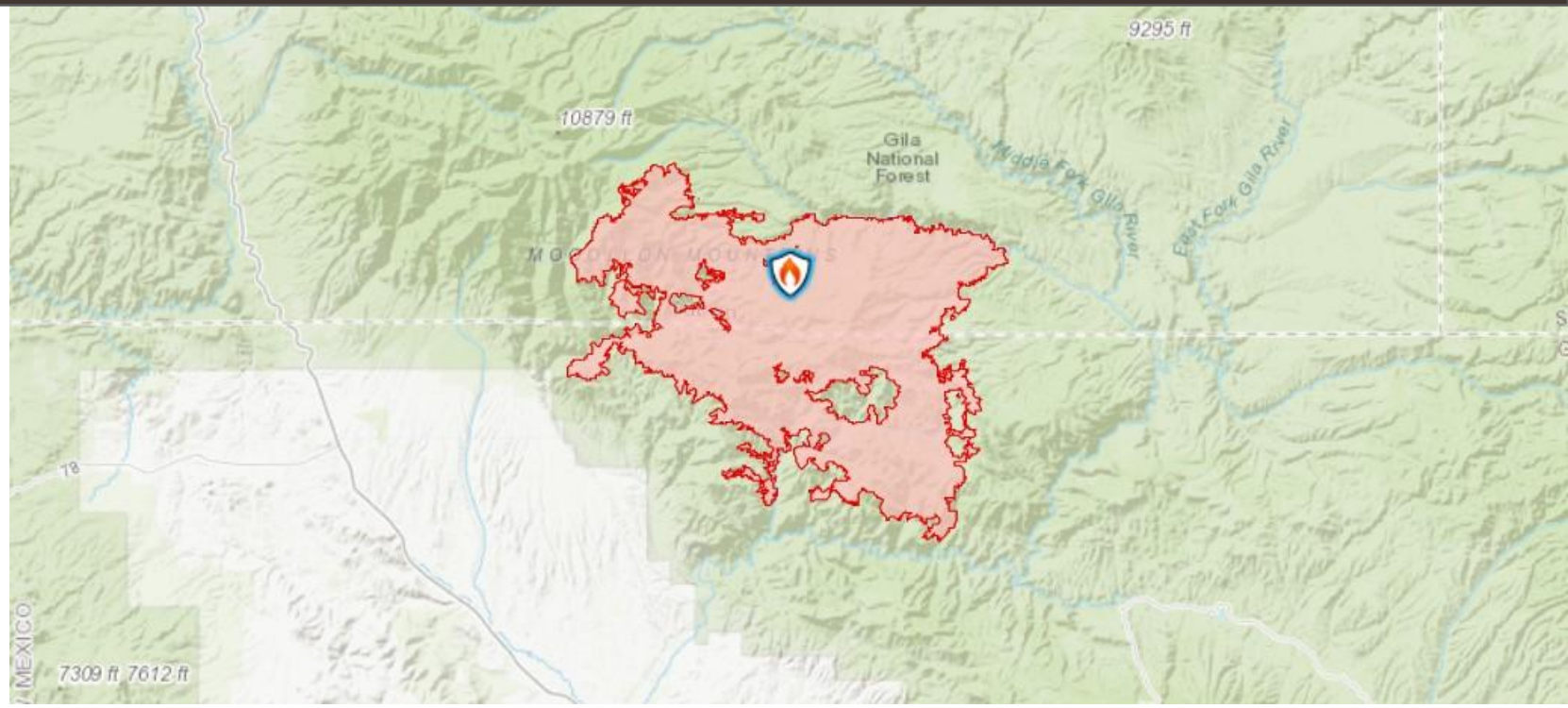
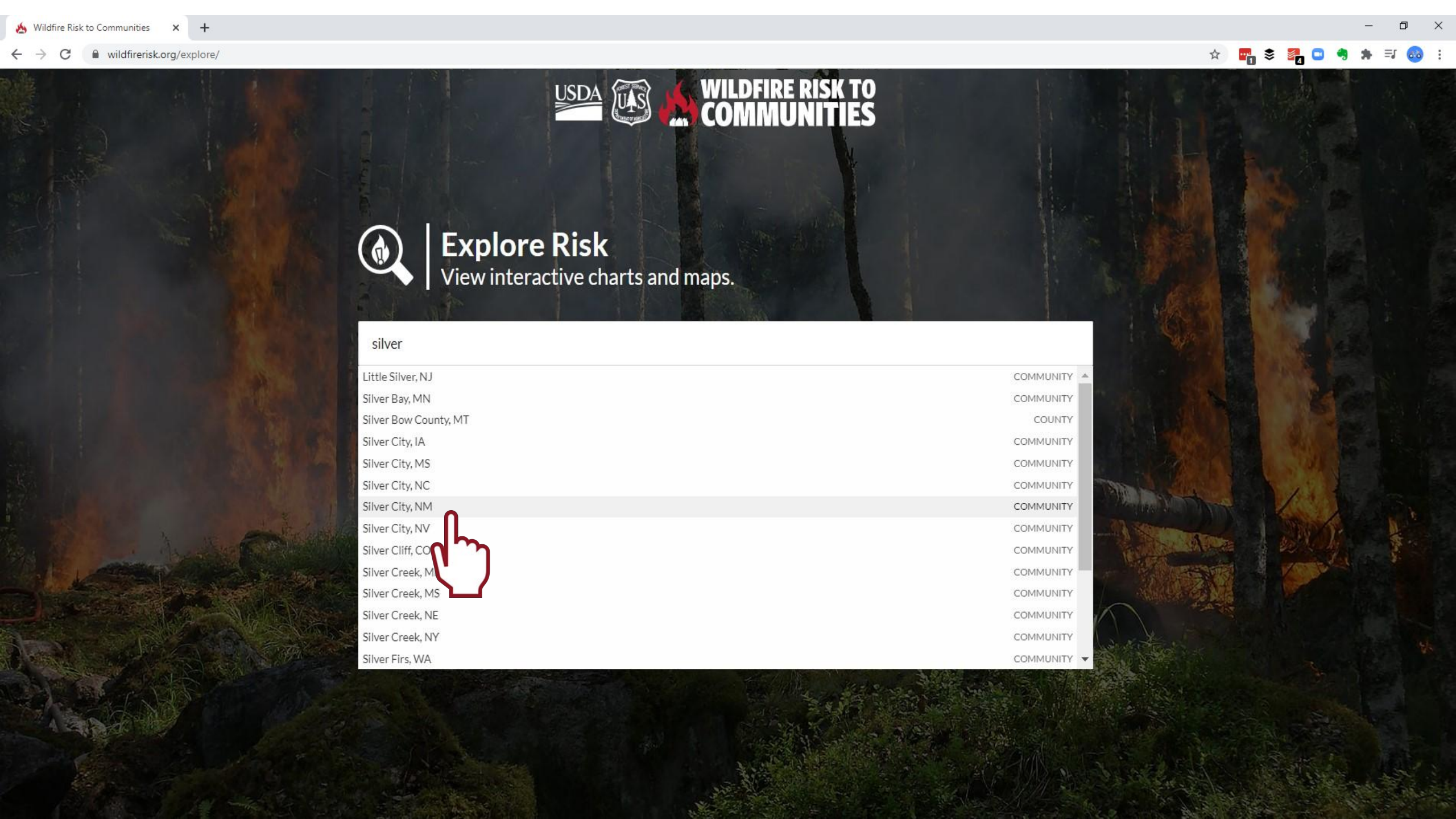
Johnson Fire

- 88,918 acres
- 100% contained
- 3 miles north of Gila Cliff Dwellings




Wildfire Risk to Communities
wildfirerisk.org/explore/
USDA
WILDFIRE RISK TO COMMUNITIES
Explore Risk
View interactive charts and maps.
silver
Little Silver, NJ COMMUNITY
Silver Bay, MN COMMUNITY
Silver Bow County, MT COUNTY
Silver City, IA COMMUNITY
Silver City, MS COMMUNITY
Silver City, NC COMMUNITY
Silver City, NM COMMUNITY
Silver City, NV COMMUNITY
Silver Cliff, CO COMMUNITY
Silver Creek, M COMMUNITY
Silver Creek, MS COMMUNITY
Silver Creek, NE COMMUNITY
Silver Creek, NY COMMUNITY
Silver Firs, WA COMMUNITY

Wildfire Risk to Communities

beta.wildfirerisk.org/explore/0/46/46103/

USDA | WILDFIRE RISK TO COMMUNITIES | Search by state, county, community | Take Action | Download | Glossary

New Mexico > Grant County >

Silver City

Risk to Homes
Integrates wildfire likelihood and intensity with generalized consequences to a home everywhere on the landscape.

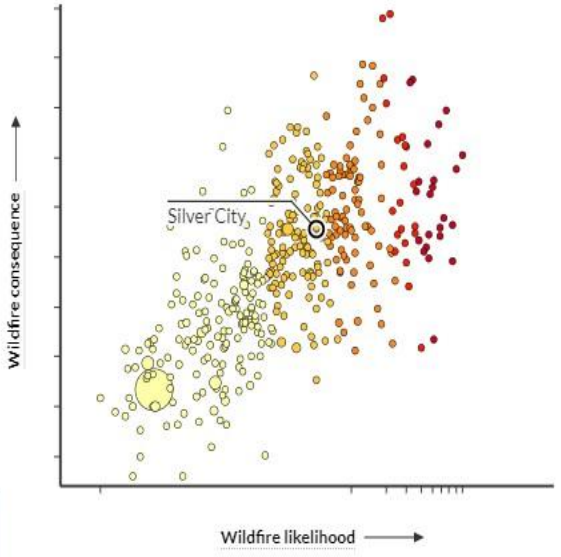
Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

Risk to Homes

Populated areas in Silver City have, on average, greater risk than 65% of communities in New Mexico.

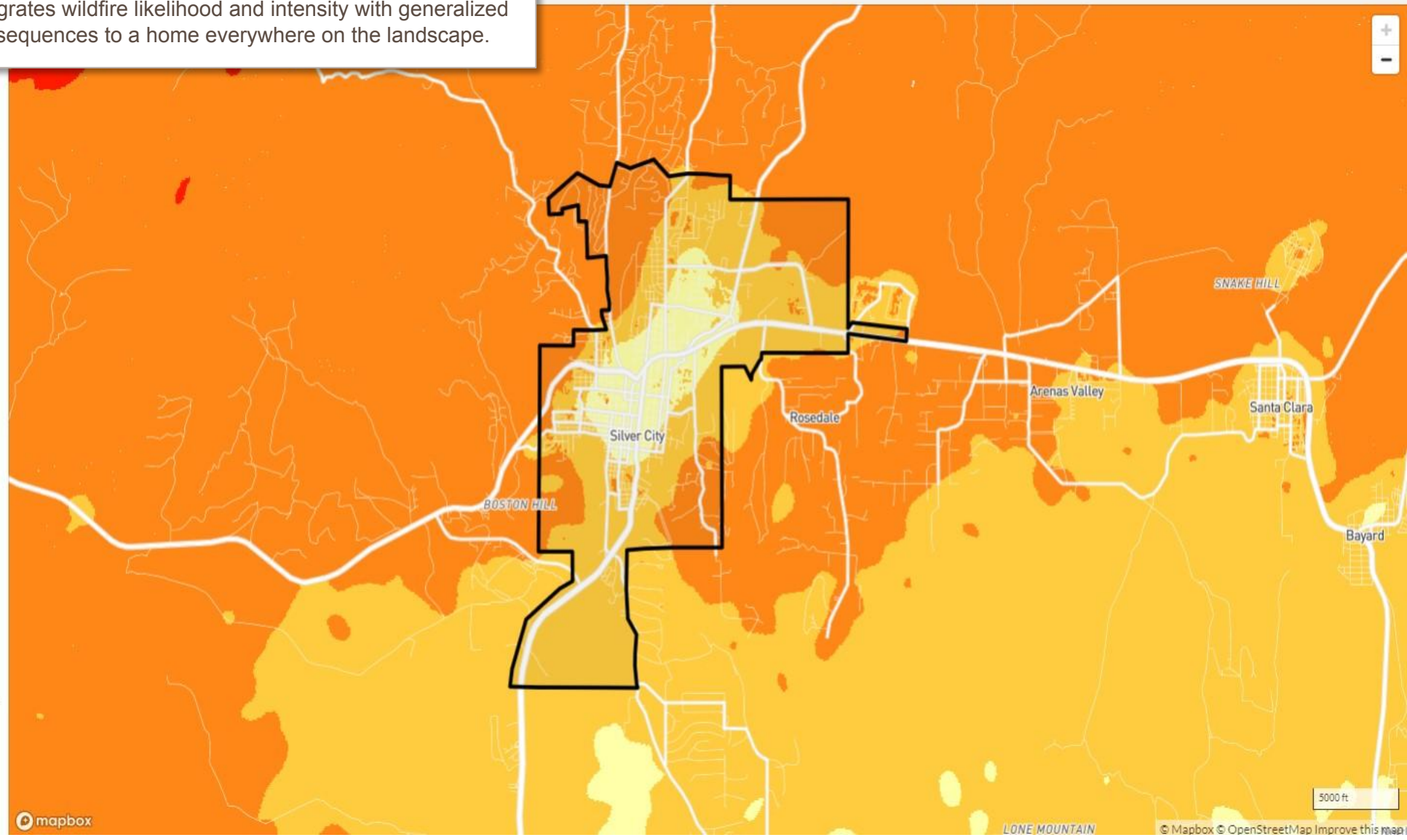
Risk to homes in NM
Lower — Higher

Population
Lower — Higher



Take Action

How can my community take action against wildfire? Find ways to reduce risk.



Wildfire Risk to Communities

beta.wildfirerisk.org/explore/0/46/46103/

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Search by state, county, community

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Silver City

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

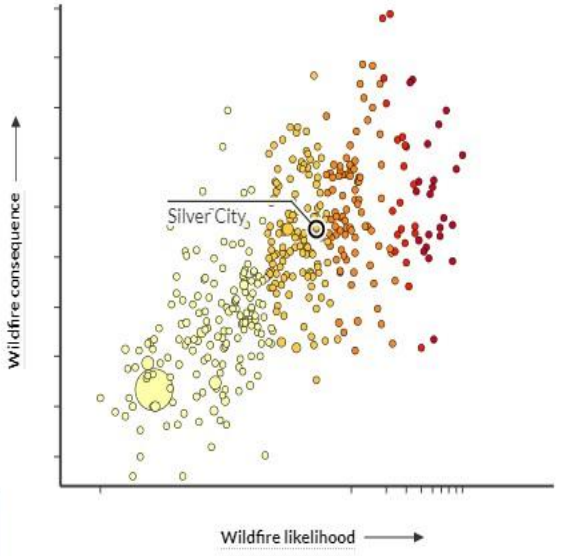
Risk to Homes

Compare to: New Mexico

Populated areas in Silver City [illegible] average, greater risk than 65% of communities in New Mexico.

Risk to homes in NM: Lower – Higher

Population: Lower – Higher



Take Action

How can my community take action against wildfire? Find ways to reduce risk.

Show all lands | Show populated areas only

Silver City
Rosedale
Arenas Valley
Santa Clara
Bayard
SNAKE HILL
BOSTON HILL
LONE MOUNTAIN

5000 ft

mapbox

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Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

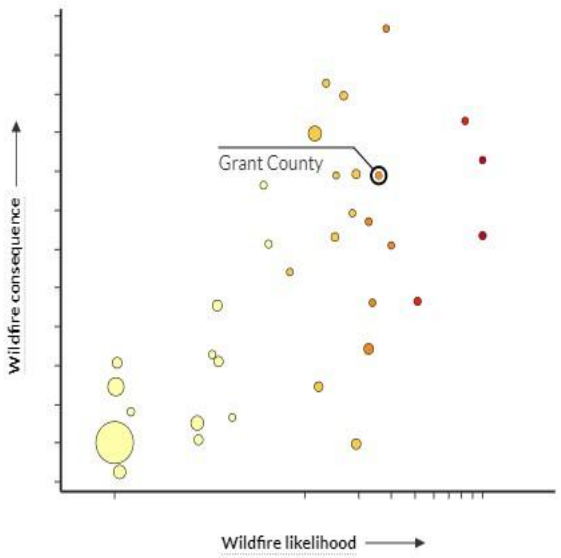
Risk to Homes

Compare to: New Mexico

Populated areas in Grant County have, on average, greater risk than 81% of counties in New Mexico.

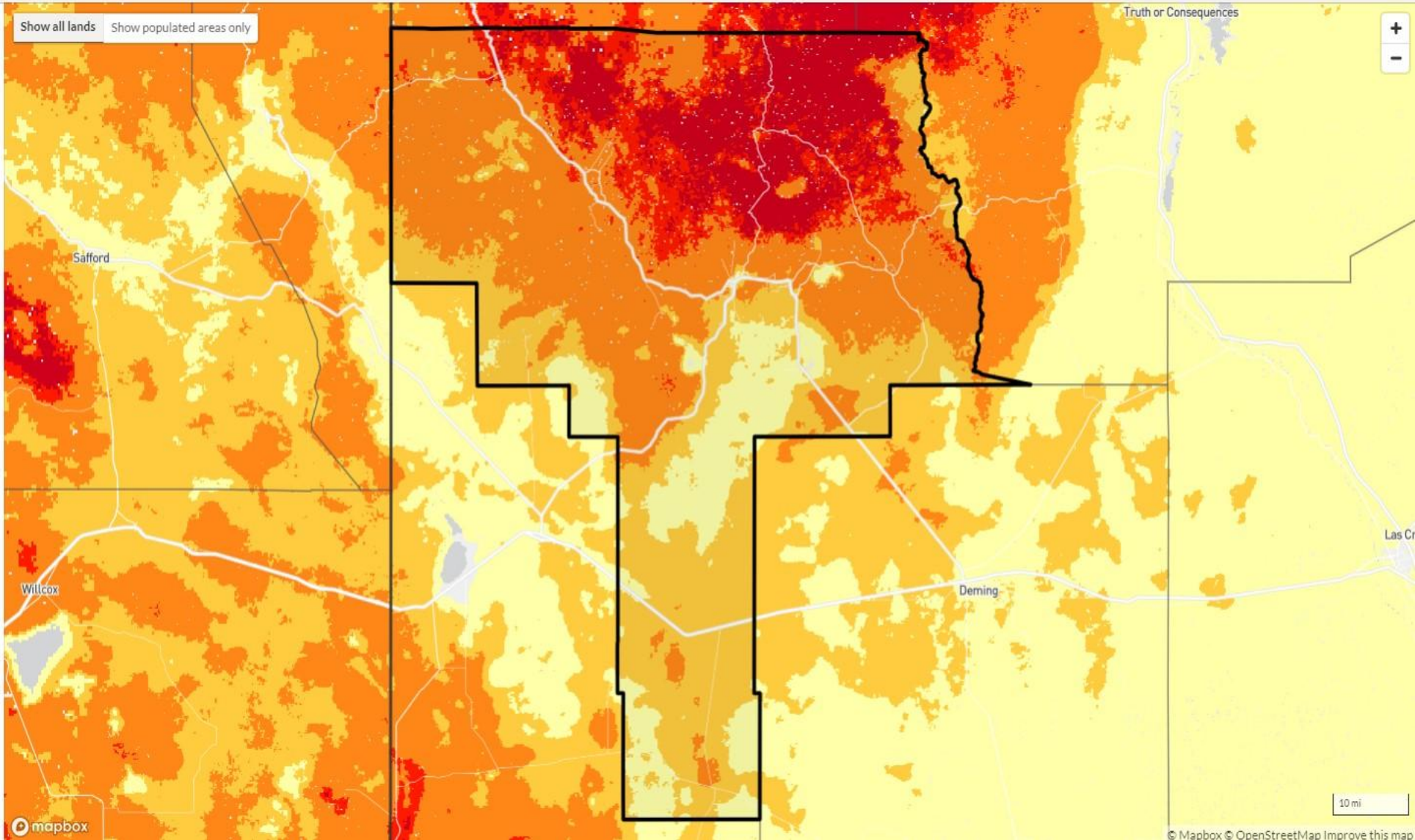
Risk to homes in NM: Lower – Higher

Population: Lower – Higher



Take Action

How can my community take action against wildfire? Find ways to reduce risk.



Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

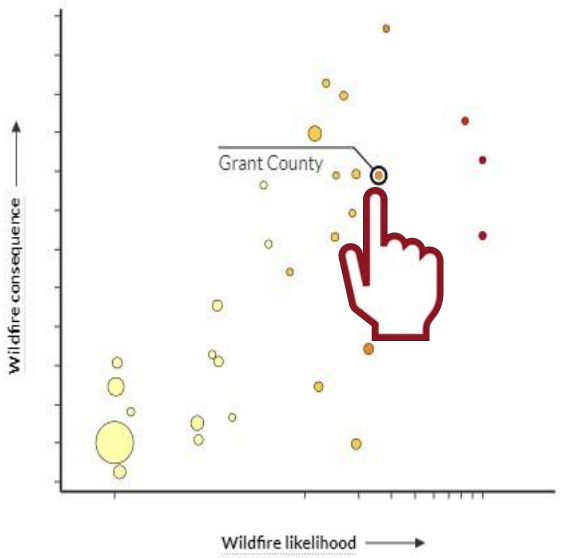
Risk to Homes

Compare to: New Mexico

Populated areas in Grant County have, on average, greater risk than 81% of counties in New Mexico.

Risk to homes in NM: Lower — Higher

Population: Lower — Higher



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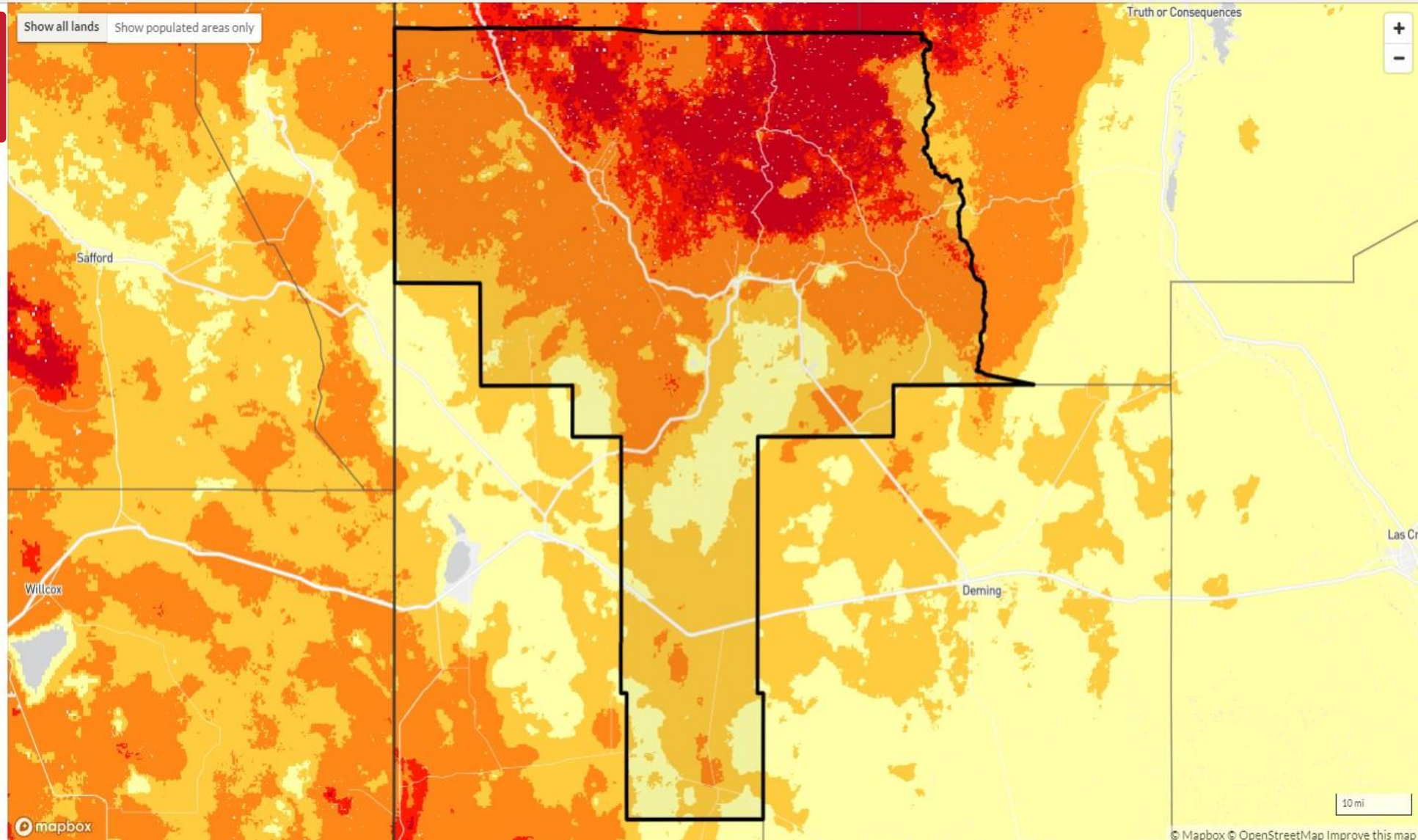

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

Risk to Homes

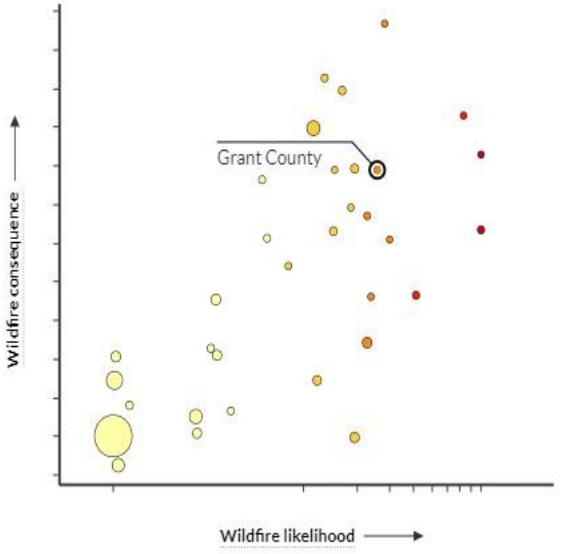
Compare to: New Mexico

Populated areas in Grant County have, risk than 81% of counties in New Mexico

- New Mexico
- Nation

Risk to homes in NM: Lower — Higher

Population: Lower — Higher



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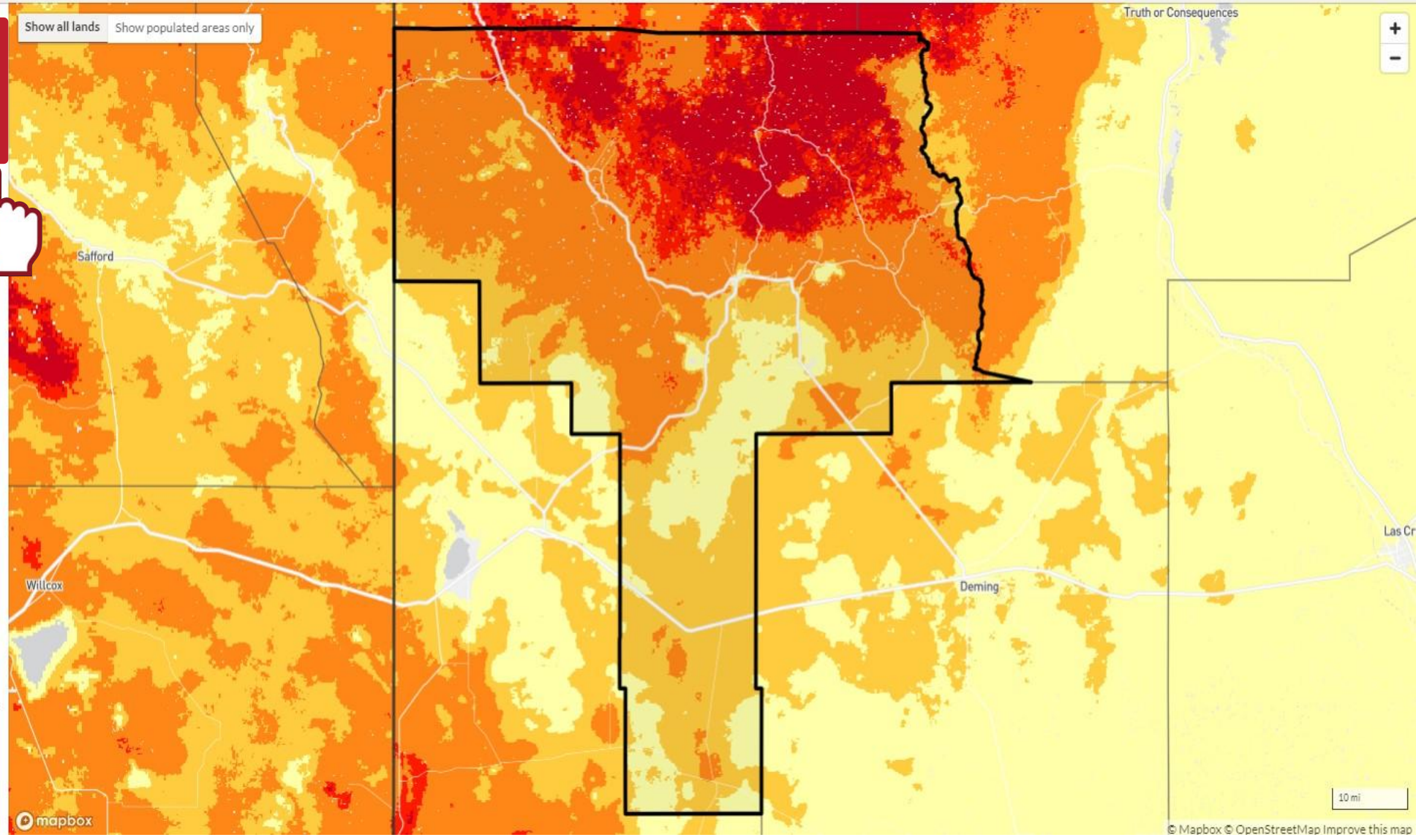
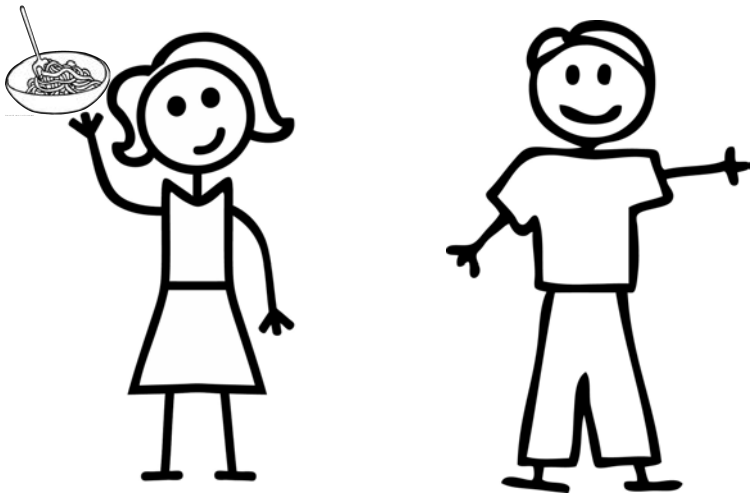


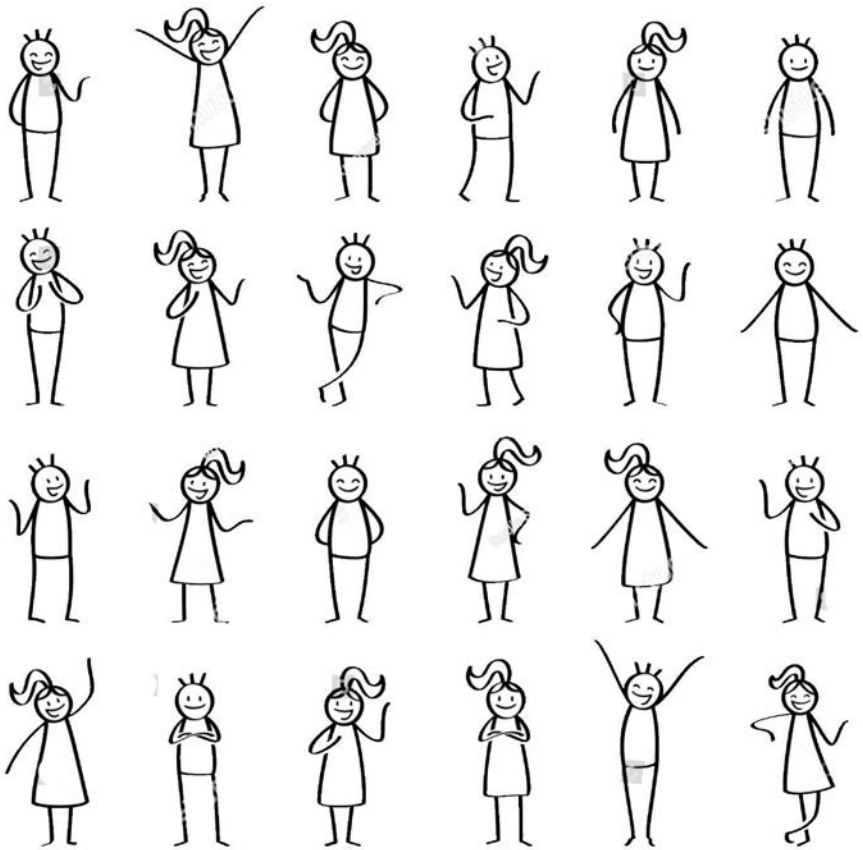
Depends who you're comparing yourself to…

Me Husband



Me

Anybody else



Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

Risk to Homes

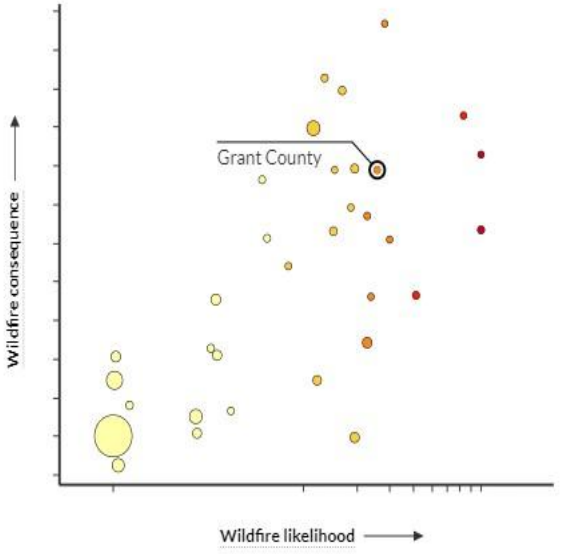
Compare to: New Mexico

Populated areas in Grant County have, risk than 81% of counties in New Mexico

- New Mexico
- Nation

Risk to homes in NM: Lower — Higher

Population: Lower — Higher



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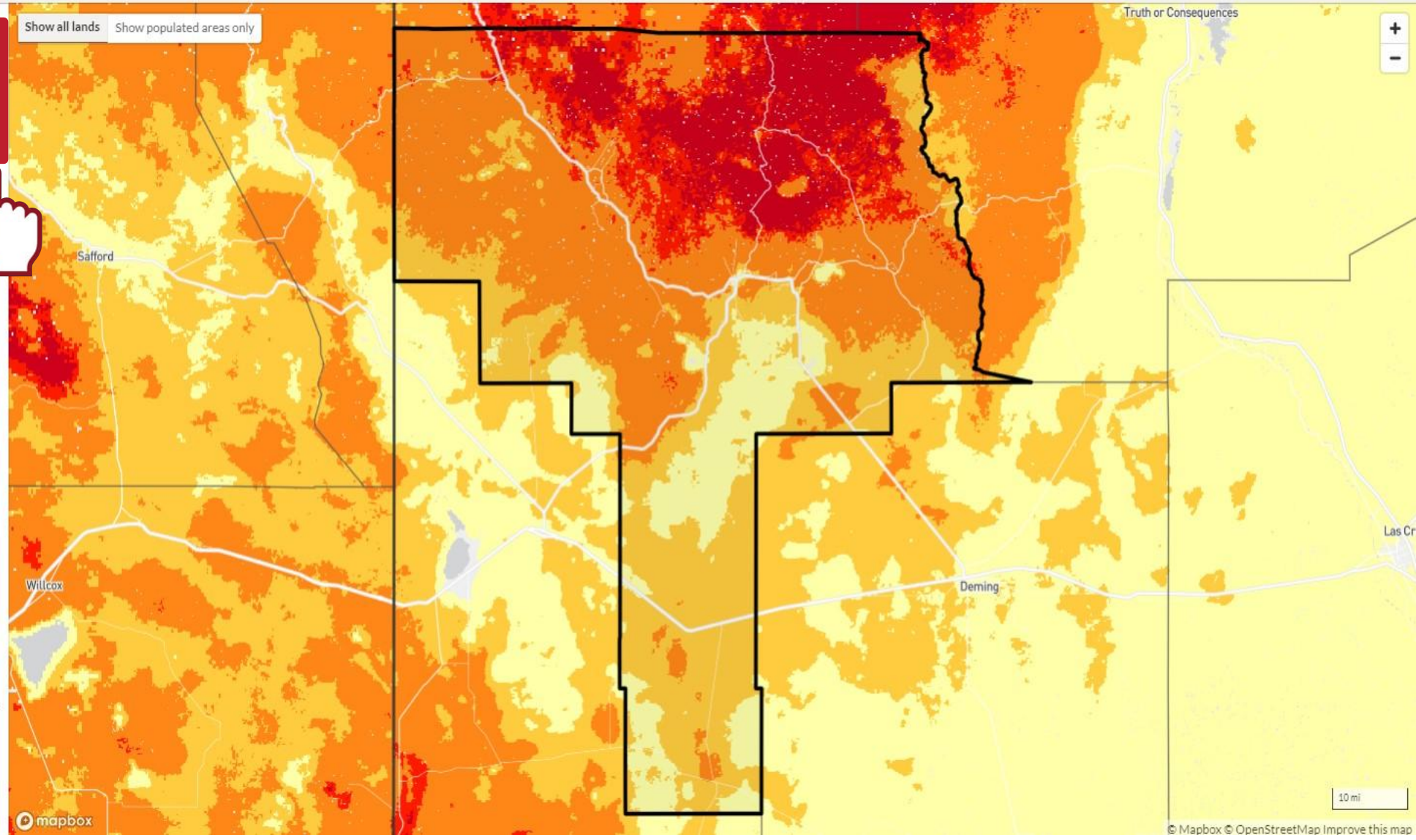

Wildfire Risk to Communities

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Search by state, county, community

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

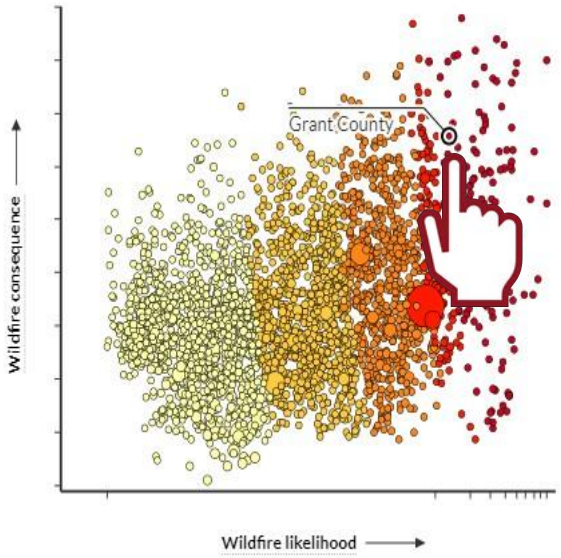
Risk to Homes

Compare to: Nation

Populated areas in Grant County have, on average, greater risk than 95% of counties in the US.

Risk to homes in US: Lower — Higher

Population: Lower — Higher



Take Action

How can my community take action against wildfire? Find ways to reduce risk.

Show all lands | Show populated areas only

Truth or Consequences

Safford

Willcox

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mapbox

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Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

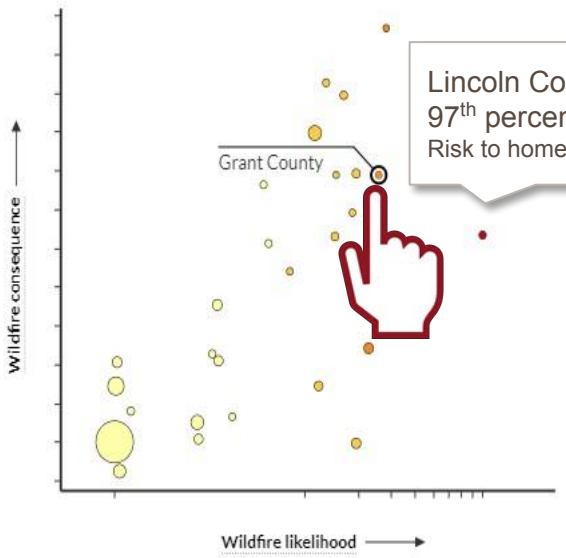
Risk to Homes

Compare to: New Mexico

Populated areas in Grant County have, on average, greater risk than 81% of counties in New Mexico.

Risk to homes in NM: Lower – Higher

Population: Lower – Higher



Lincoln County, NM
97th percentile
Risk to homes

Take Action

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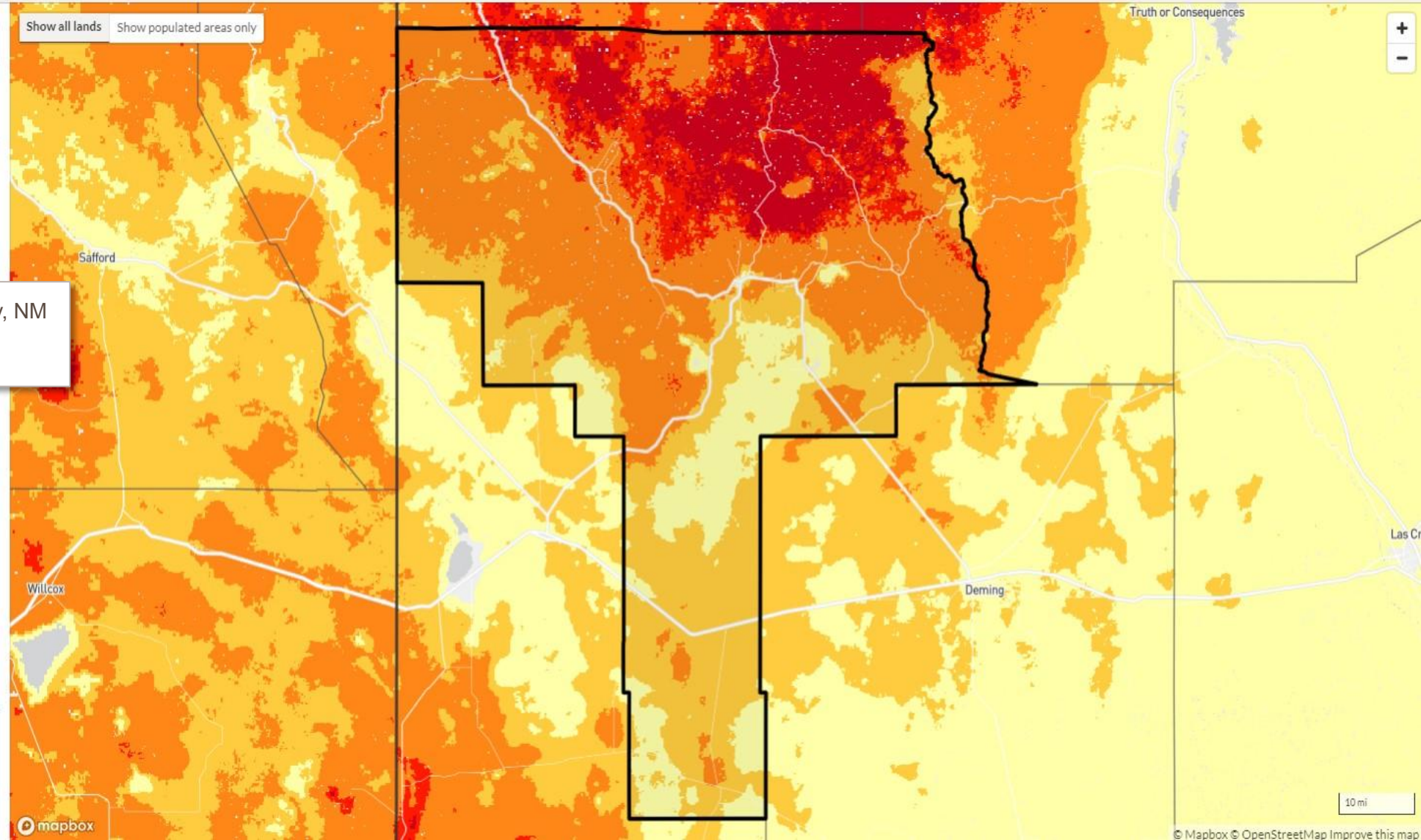

Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

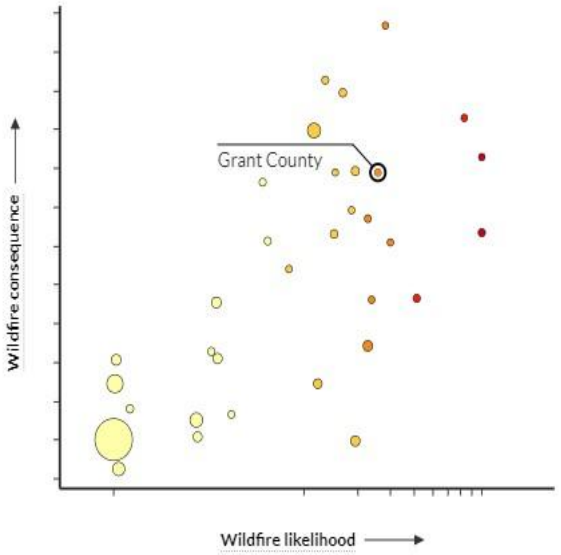
Risk to Homes

Compare to: New Mexico

Populated areas in Grant County have, on average, greater risk than 81% of counties in New Mexico.

Risk to homes in NM: Lower – Higher

Population: Lower – Higher



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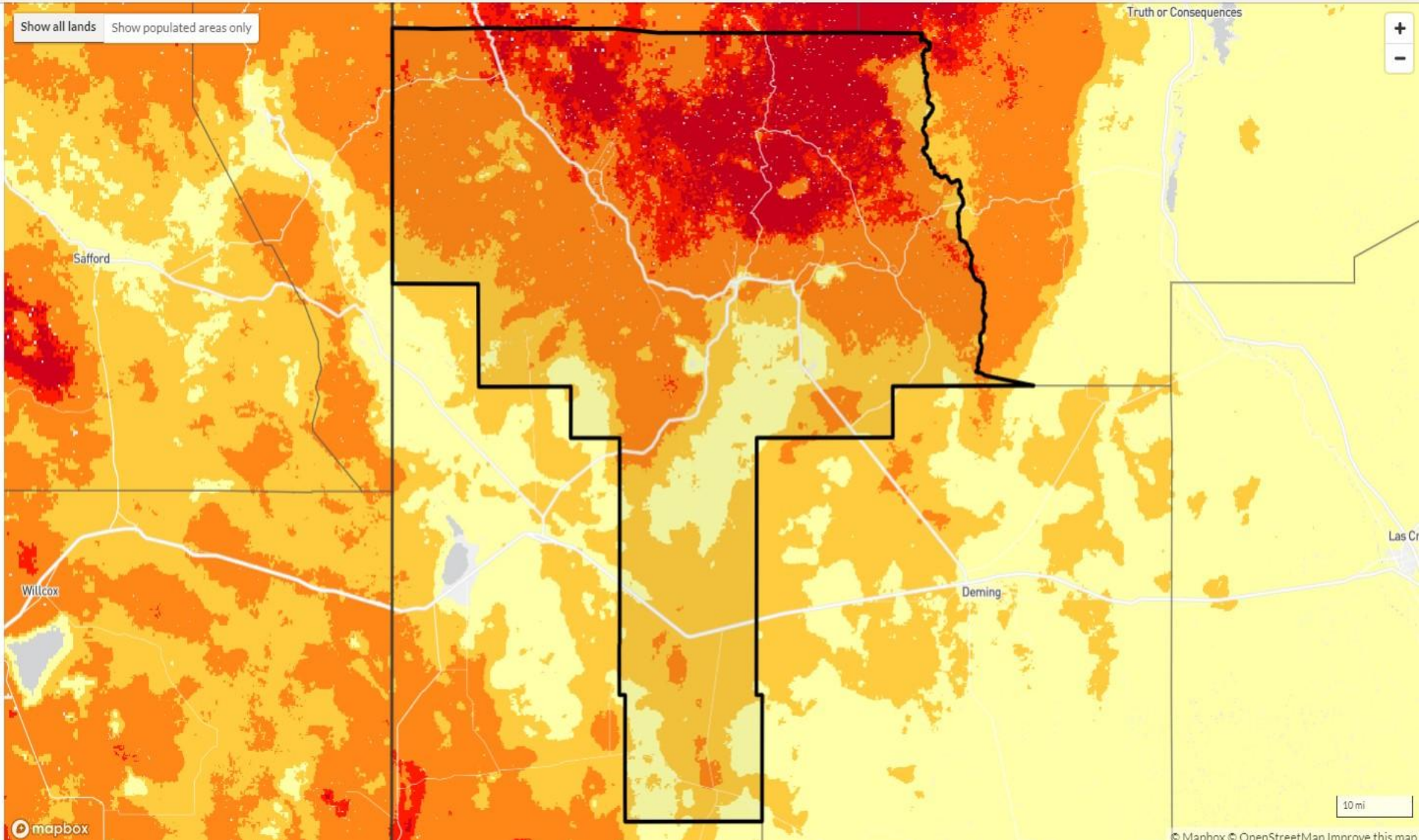

Wildfire Risk to Communities

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Search by state, county, community

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New Mexico >

Grant County

Risk to Home | Exposure Type | Wildfire Likelihood | Vulnerable Populations

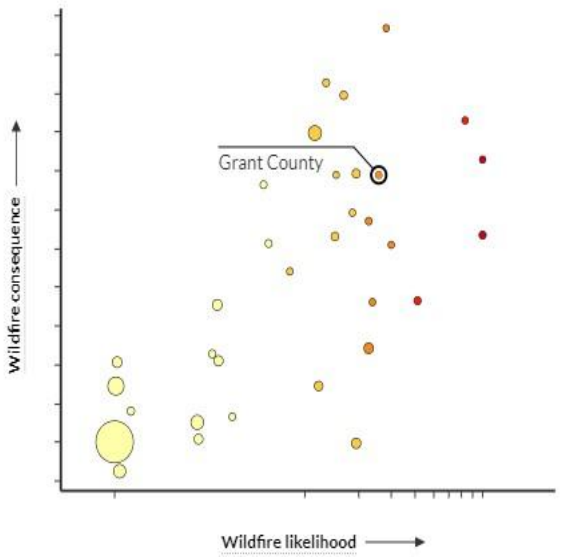
Risk to Homes

Compare to: New Mexico

Populated areas in Grant County have, on average, greater risk than 81% of counties in New Mexico.

Risk to homes in NM: Lower — Higher

Population: Lower — Higher



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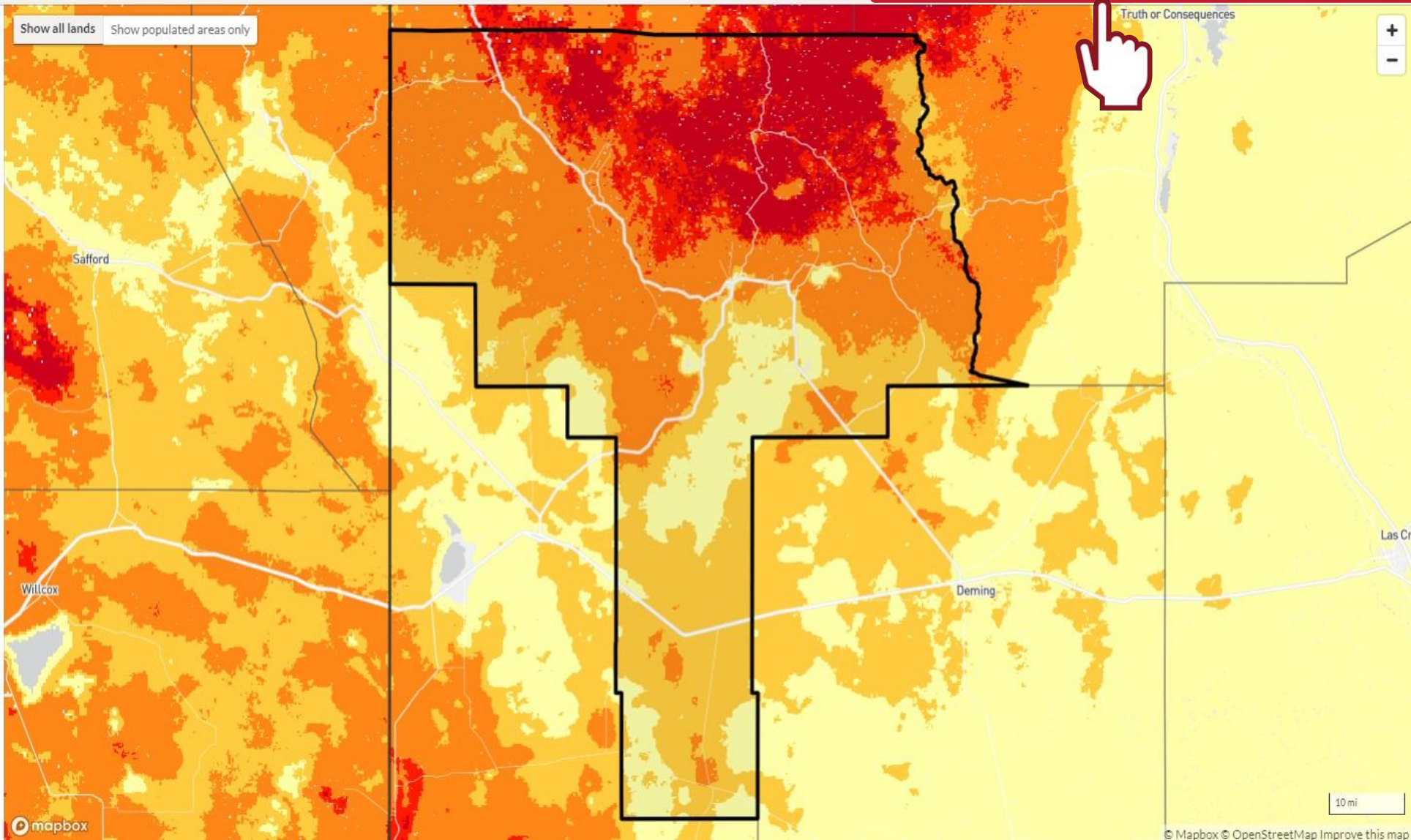

Wildfire Risk to Communities

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New Mexico >

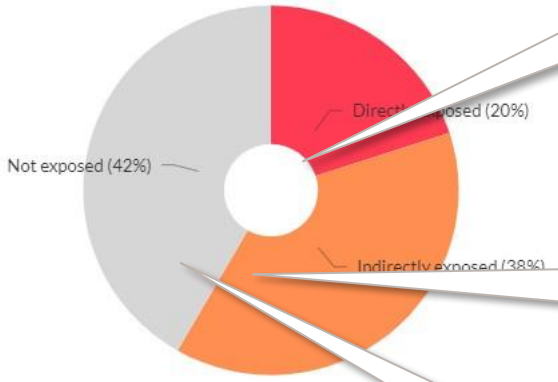
Bernalillo County

Risk to Homes | **Exposure Type** | Wildfire Likelihood | Vulnerable Populations

Exposure Type

Populated areas in Bernalillo County are predominantly not exposed and are not likely to be subjected to wildfire directly or indirectly.

Directly exposed | Indirectly exposed | Not exposed



Direct Exposure
Adjacent flammable wildland vegetation and direct flame contact

Indirect Exposure
Embers and home-to-home ignitions

Not Exposed
Non-flammable surfaces

Show all lands | Show populated areas only

Rio Rancho, Bernalillo, Corrales, Golden, Paradise Hills, North Valley, SANDIA MOUNTAINS, Sandia Heights, Sandia Park, Cedar Grove, Albuquerque, Cedar Crest, Edgewood, Sedillo, Carnuel, Cedro, Pajarito Mesa, South Valley, Ponderosa Pine, Isleta Village Proper, Chilili, Peralta, Los Lunas, Meadow Lake, El Cerro

mapbox | © Mapbox © OpenStreetMap Improve this map

Take Action
How can my community take action against wildfire? Find ways to reduce risk.

Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

Wildfire Likelihood
Annual probability of wildfire burning in a specific location.

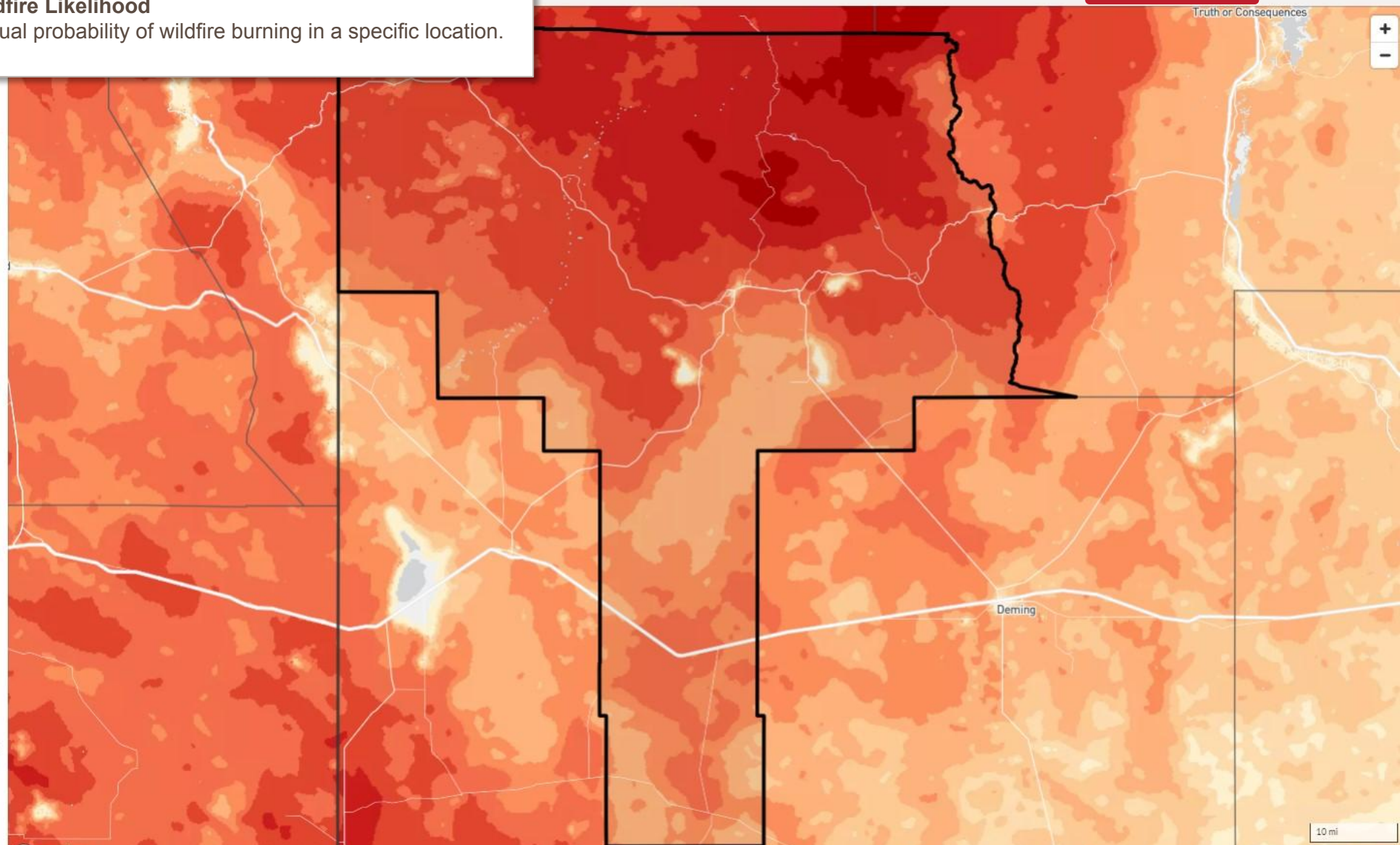
Wildfire Likelihood

Populated areas in Grant County have, on average, greater wildfire likelihood than 81% of counties in New Mexico.

Wildfire likelihood
Lower — Higher

Population
Lower — Higher

Wildfire likelihood →



Take Action
How can my community take action against wildfire? Find ways to reduce risk.

Wildfire Risk to Communities

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Search by state, county, community

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

Wildfire Likelihood

Compare to: New Mexico

Populated areas in Grant County have, on average, greater wildfire likelihood than 81% of counties in New Mexico.

Wildfire likelihood

Lower — Higher

Population

Lower — Higher

Wildfire likelihood →

Take Action

How can my community take action against wildfire? Find ways to reduce risk.

Show all lands | Show populated areas only

Truth or Consequences

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Grant County

Vulnerable Populations

The population of Grant County is 28,061. Potentially vulnerable populations may experience difficulty preparing for and responding to wildfire.

	Number		Percent	
Families in poverty	1,111	±193	15.5%	±2.5%
People with disabilities	5,285	±419	19.1%	±1.5%
People over 65 years	7,197	±458	25.6%	±1.6%
Difficulty with English	312	±140	1.2%	±0.5%
Households with no car	814	±207	6.8%	±1.7%
Mobile homes	3,403	±389	28.4%	±3.1%

Data are from the most recent five-year rolling survey period of the U.S. Census Bureau American Community Survey.

Take Action

How can my community take action against wildfire? Find ways to reduce risk.

Wildfire Risk to Communities

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New Mexico >

Grant County

Risk to Homes | Exposure Type | Wildfire Likelihood | Vulnerable Populations

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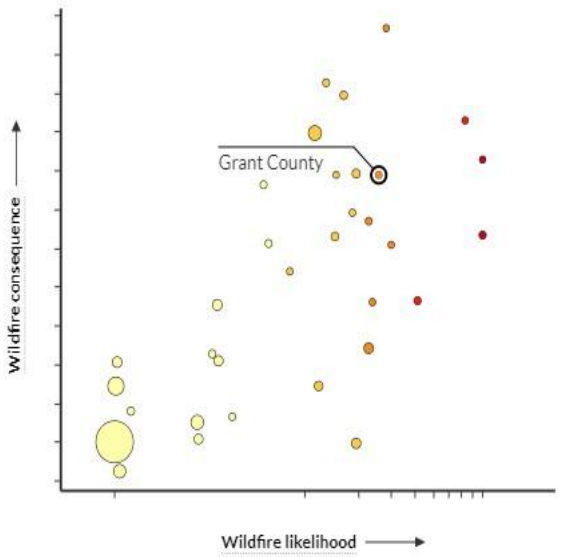

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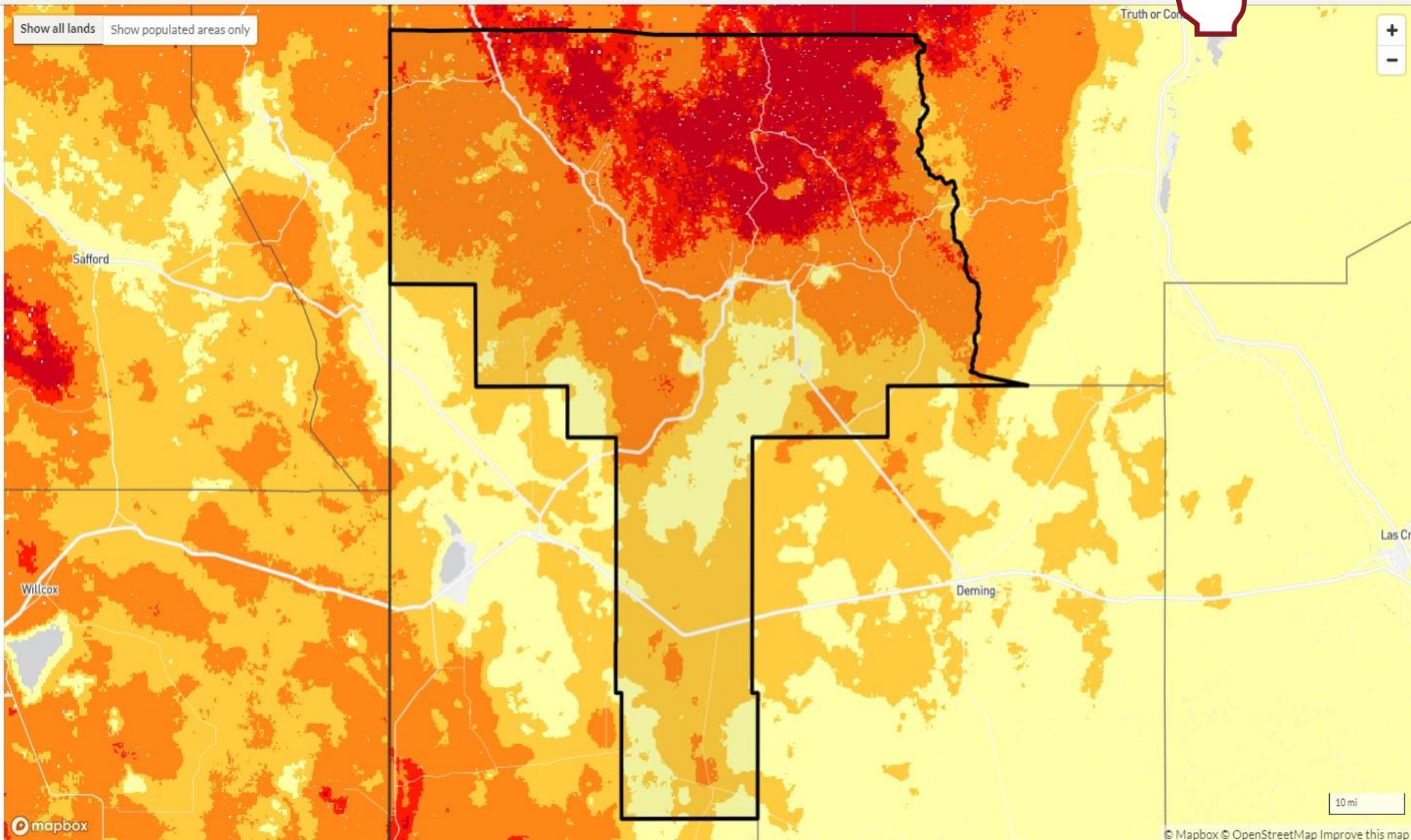
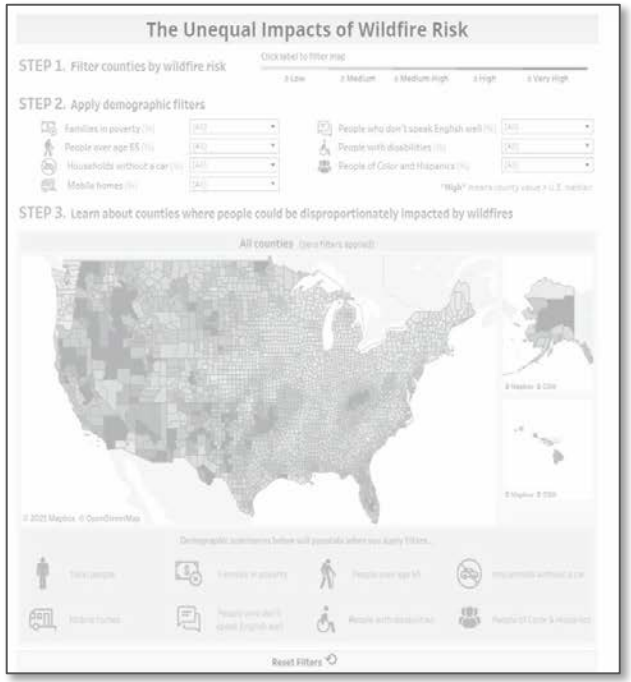


www.wildfirerisk.org

Interactive Tools for Wildfire Risks

WILDFIRE RISK TO COMMUNITIES



Wildfire Risk Report for every U.S. community

February 2021

Wildfires have gotten bigger, more expensive, and more damaging in recent decades. Better understanding of wildfire risk can help communities prioritize prevention and mitigation measures to reach the most vulnerable people. A new report from Headwaters Economics provides community-level data about wildfire hazard and potentially vulnerable populations. The report is part of our Economic Profile System, a free, easy-to-use tool that builds customized reports from public data.

Run a Wil[illegible]e Risk Report

A custom [illegible]port showing wildfire hazard, potentially vulnerable populations, and more.

Which community, county, or state?

See more socioeconomic reports

Wildfire Risk Report for every U.S. community

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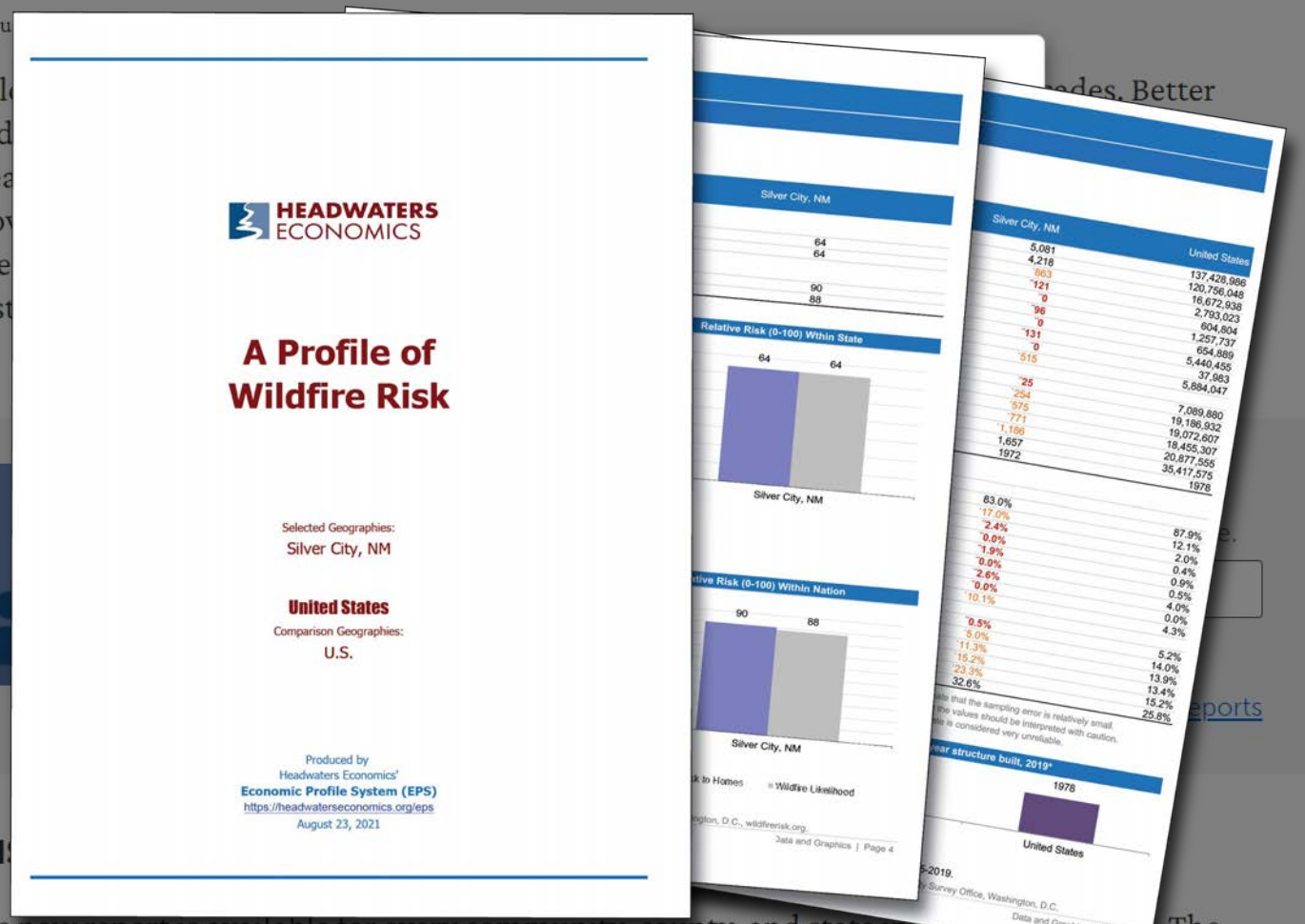


eports

Cu

The new report is available for every community, county, and state in the . The report includes information about:

Wildfire risk and exposure. This section provides information about wildfire risk to homes, wildfire likelihood, and wildfire exposure type. It notes whether a community is directly

Wildfire Risk

Combined Area

Table of Contents

Wildfire Risk

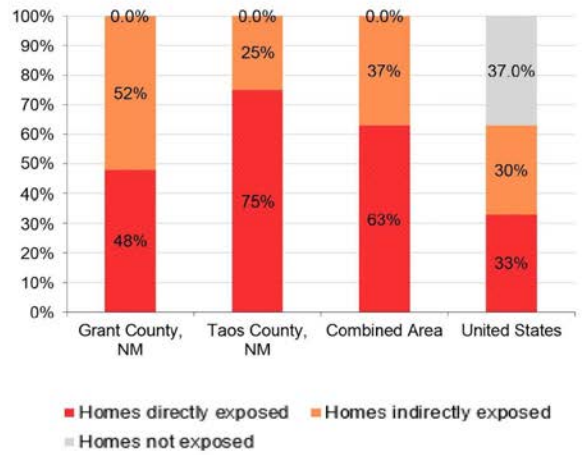
Combined Area

Wildfire Exposure

	Grant County, NM	Taos County, NM	Combined Area	United States
Percent of Total				
Homes directly exposed	48.0%	75.0%	63.0%	33.0%
Homes indirectly exposed	52.0%	25.0%	37.0%	30.0%
Homes not exposed	0.0%	0.0%	0.0%	37.0%

Exposure of Homes to Wildfire

- 75% of homes in Taos County, NM are exposed to wildfire from direct sources, such as adjacent flammable vegetation.
- 52% of homes in Grant County, NM are exposed to wildfire from indirect sources, such as embers or home-to-home ignition.



Data Sources: USDA Forest Service, Wildfire Risk to Communities. 2020. Washington, D.C., wildfirerisk.org.

Wildfire Risk
Combined Area

Wildfire Exposure

What do we measure on this page?

Wildfire Exposure is the spatial coincidence of wildfire likelihood (the probability of wildfire occurring) and wildfire intensity (the energy released by a wildfire) with communities.

Why is it important?

Any part of a community that is located where wildfire likelihood is greater than zero is exposed to wildfire. For example, a home in a flammable forest is exposed to wildfire. Locations within a community can be directly exposed to wildfire from adjacent wildland vegetation, or indirectly exposed to wildfire from embers (firebrands) and home-to-home ignition. Locations within a community that are not exposed are not likely to be subjected to wildfire from either direct or indirect sources.

Communities can reduce their exposure to wildfire with actions such as modifying the home ignition zone and using land use planning tools.

Wildfire Risk

Combined Area

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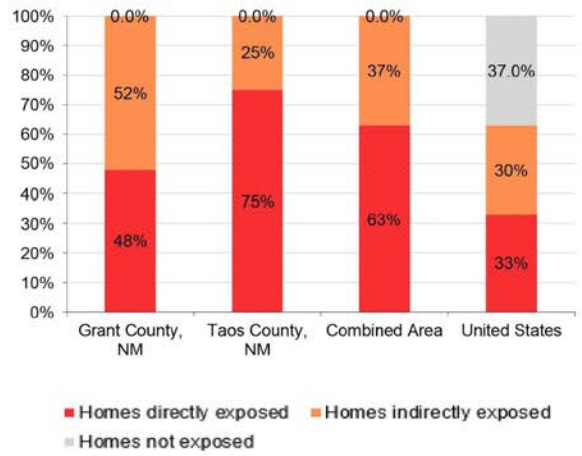

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Data

Wildfire Risk
Combined Area
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Wildfire Risk

Combined Area

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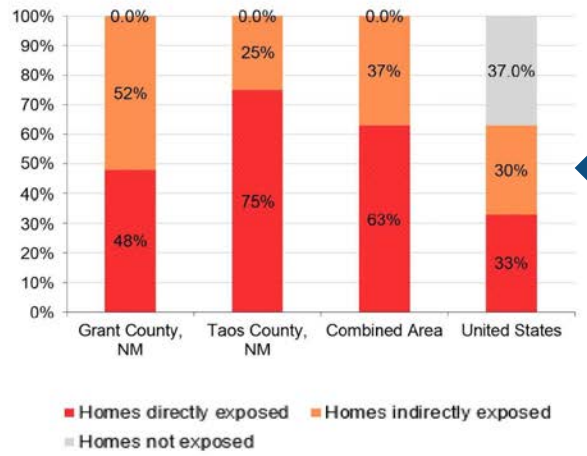

Data Sources: USDA Forest Service, Wildfire Risk to Communities. 2020. Washington, D.C., wildfirerisk.org.

Graphs

Wildfire Risk

Combined Area

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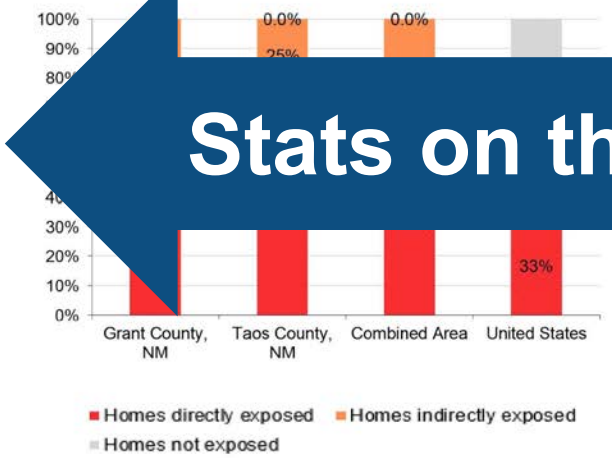


Stats on the fly

Data Sources: USDA Forest Service, Wildfire Risk to Communities. 2020. Washington, D.C., wildfirerisk.org.

Wildfire Risk
Combined Area

Wildfire Exposure

What do we measure on this page?

Wildfire Exposure is the spatial coincidence of wildfire likelihood (the probability of wildfire occurring) and wildfire intensity (the energy released by a wildfire) with communities.

Why is it important?

Any part of a community that is located where wildfire likelihood is greater than zero is exposed to wildfire. For example, a home in a flammable forest is exposed to wildfire. Locations within a community can be directly exposed to wildfire from adjacent wildland vegetation, or indirectly exposed to wildfire from embers (firebrands) and home-to-home ignition. Locations within a community that are not exposed are not likely to be subjected to wildfire from either direct or indirect sources.

Communities can reduce their exposure to wildfire with actions such as modifying the home ignition zone and using land use tools.

Wildfire Risk

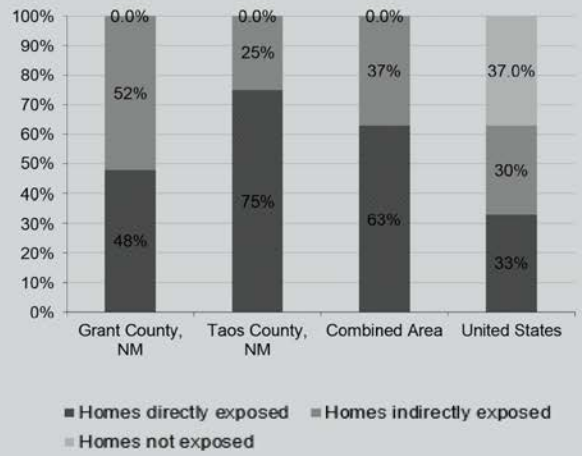
Combined Area

Wildfire Exposure

	Grant County, NM
Percent of Total	
Homes directly exposed	48.0%
Homes indirectly exposed	52.0%
Homes not exposed	0.0%

Exposure of Homes to Wildfire

- 75% of homes in Taos County, NM are exposed to wildfire from direct sources, such as adjacent flammable vegetation.
- 52% of homes in Grant County, NM are exposed to wildfire from indirect sources, such as embers or home-to-home ignition.



Data Sources: USDA Forest Service, Wildfire Risk to Communities. 2020. Washington, D.C., wildfirerisk.org.

Definitions

Wildfire Risk

Combined Area

Wildfire Exposure

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Wildfire Risk

Combined Area

Wildfire Exposure

	Grant County, NM	Taos County, NM	Combined Area	United States
Percent of Total				
Homes directly exposed	48.0%	75.0%	63.0%	33.0%
Homes indirectly exposed	52.0%	25.0%	37.0%	30.0%
Homes not exposed	0.0%	0.0%	0.0%	37.0%

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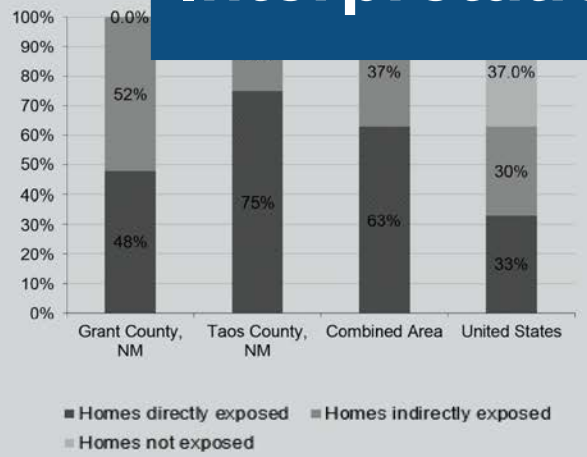

Data Sources: USDA Forest Service, Wildfire Risk to Communities. 2020. Washington, D.C., wildfirerisk.org.

Interpretation

Wildfire Risk

Combined Area

Wildfire Exposure

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https://headwaterseconomics.org/natural-hazards/wildfire-risk-report/

Run a Wildfire Risk Report

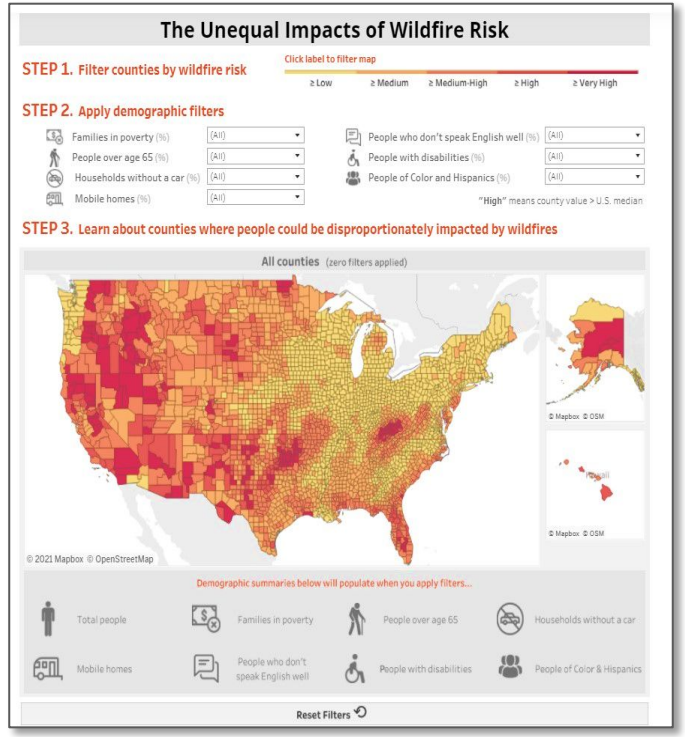
A custom report showing wildfire hazard, potentially vulnerable populations, and more.

Which community, county, or state?

See more socieoeconomic reports

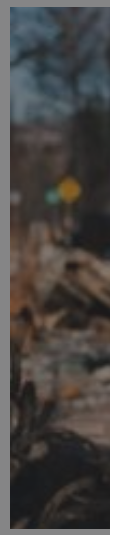
Interactive Tools for Wildfire Risks

WILDFIRE RISK TO COMMUNITIES



Wildfires do n y.


Darryl Dyck/Canadian Press




Kirk Siegler/NPR

The Unequal Impacts of Wildfire Risk

STEP 1. Filter counties by wildfire risk

Click label to filter map

≥ Low | ≥ Medium | ≥ Medium-High | ≥ High | ≥ Very High

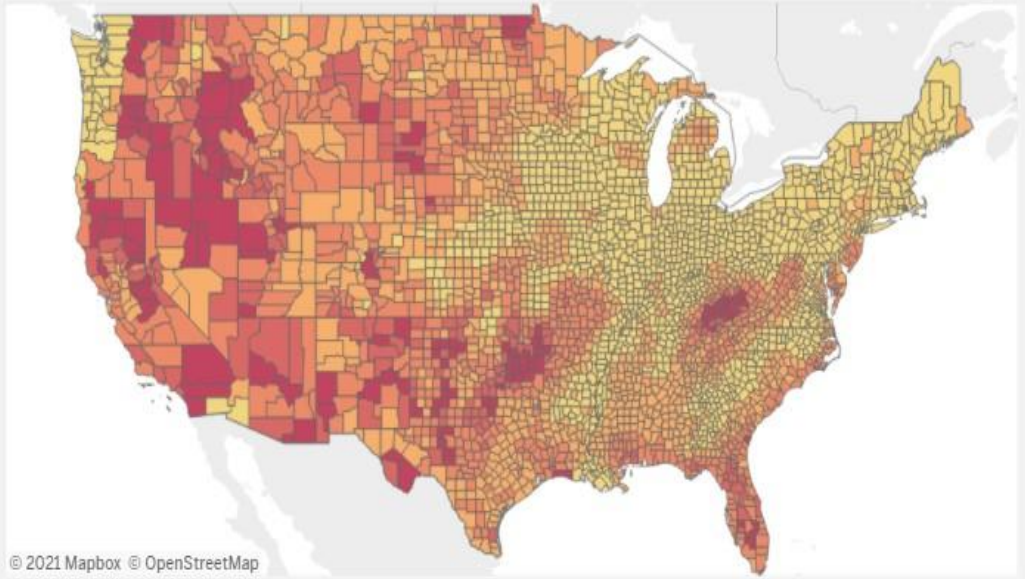
STEP 2. Apply demographic filters

Families in poverty (%)	(All)	People who don't speak English well (%)	(All)
People over age 65 (%)	(All)	People with disabilities (%)	(All)
Households without a car (%)	(All)	People of Color and Hispanics (%)	(All)
Mobile homes (%)	(All)		

"High" means county value > U.S. median

STEP 3. Learn about counties where people could be disproportionately impacted by wildfires

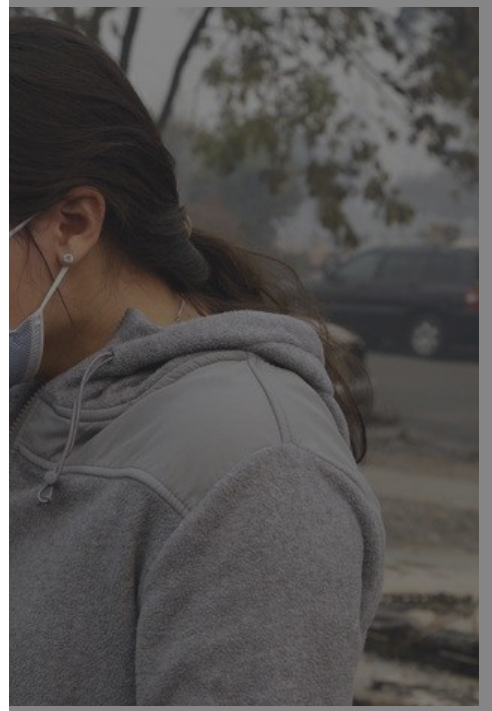
All counties (zero filters applied)

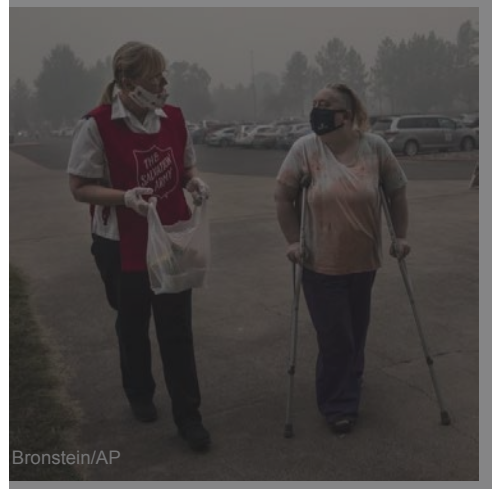


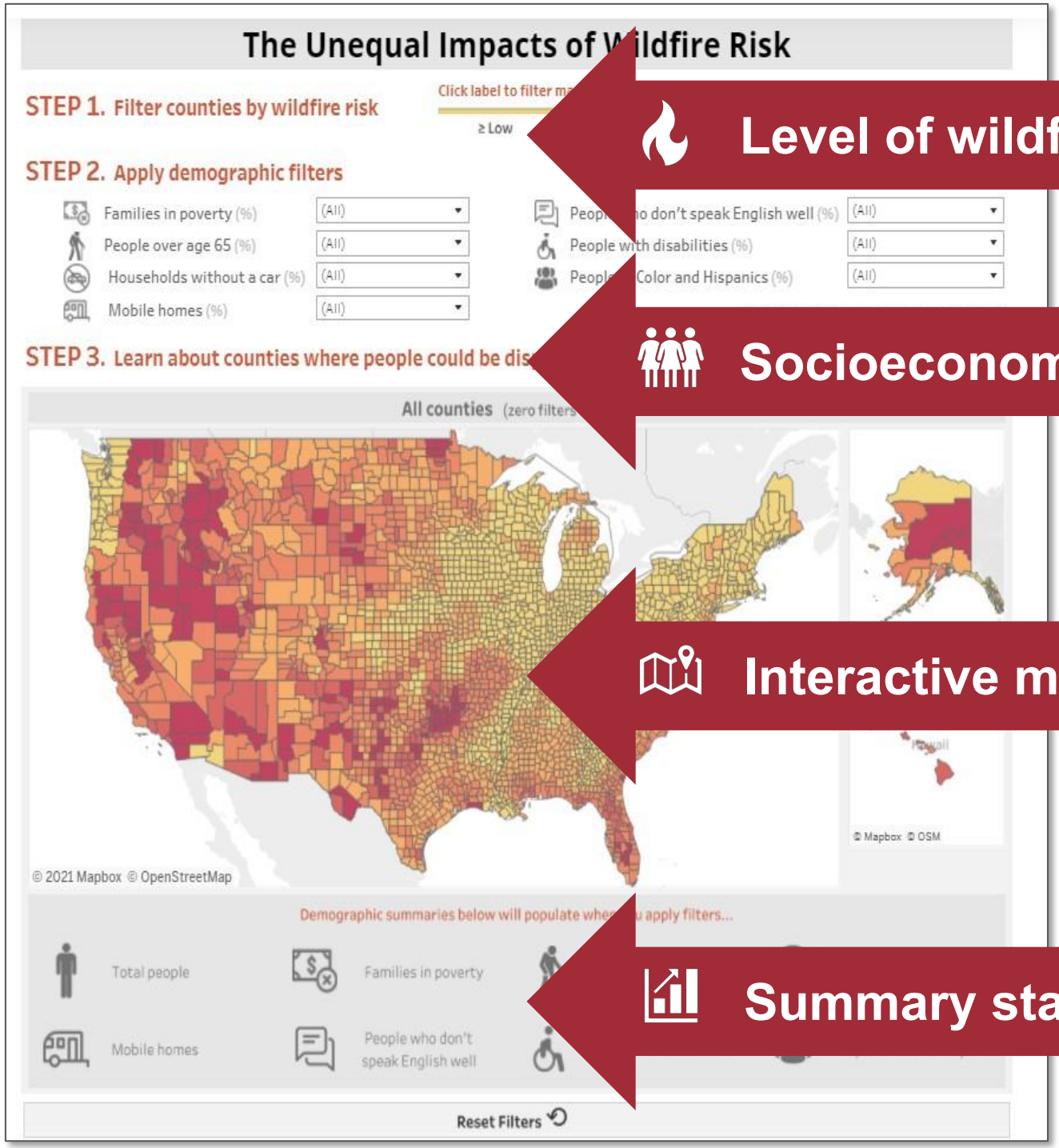
Demographic summaries below will populate when you apply filters...

Total people	Families in poverty	People over age 65	Households without a car
Mobile homes	People who don't speak English well	People with disabilities	People of Color & Hispanics

Reset Filters




Bronstein/AP

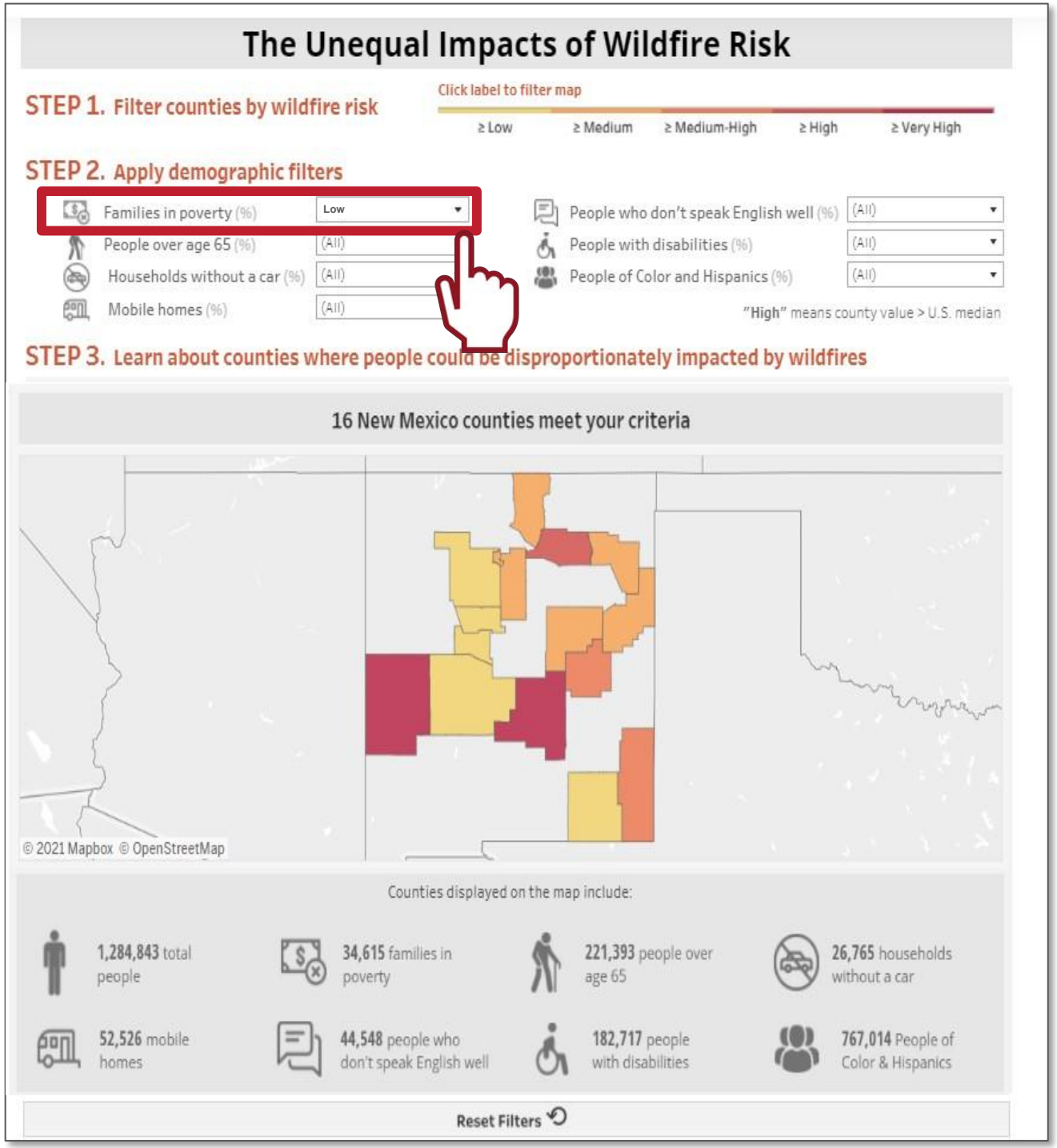


Level of wildfire risk

Socioeconomic variables

Interactive map

Summary statistics

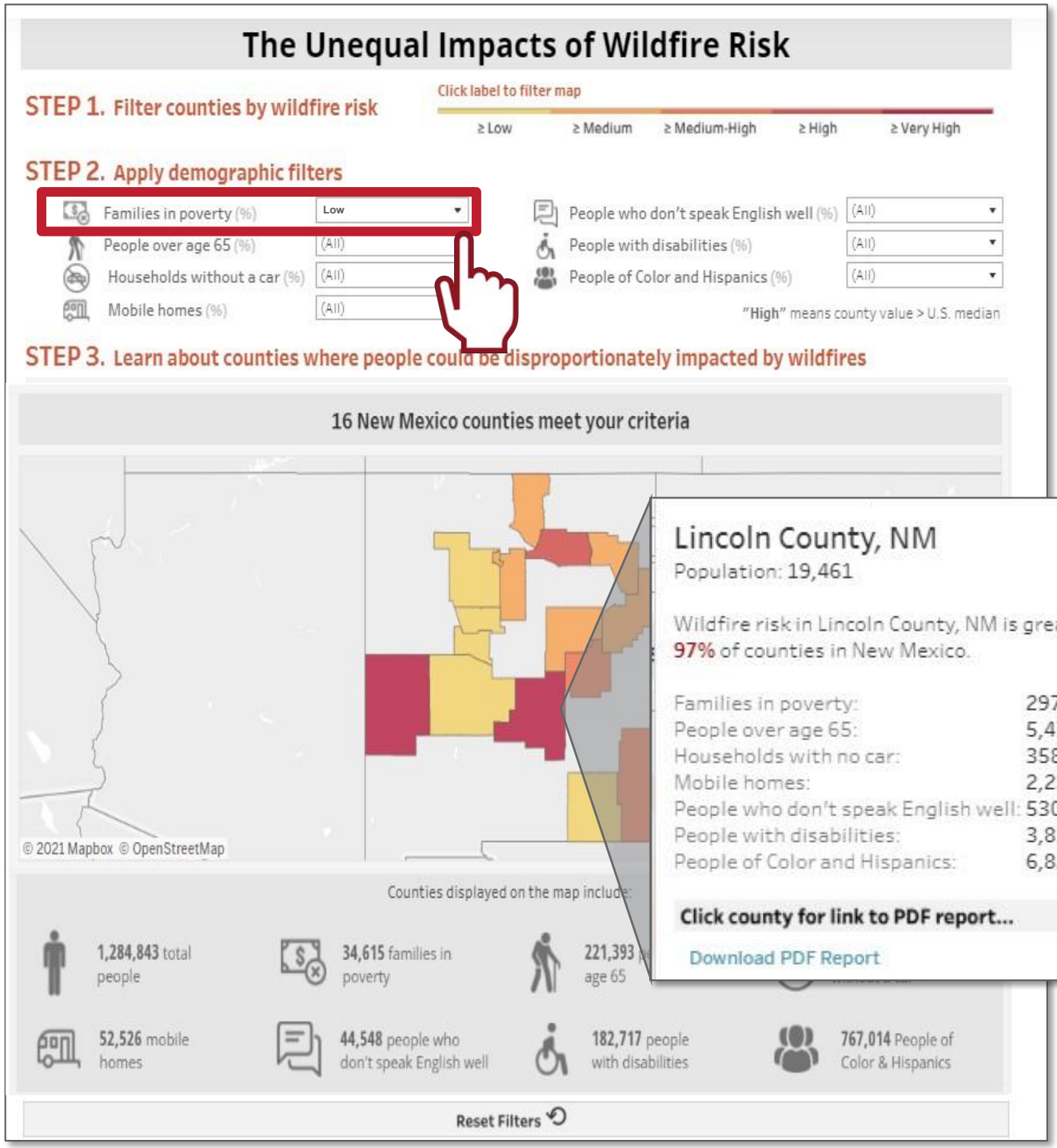


Level of wildfire risk

Socioeconomic variables

Map automatically filters

Summary statistics



Map automatically filters

Downloadable report

The unequal impacts of wildfire

September 2021

People's susceptibility to wildfire is based on their exposure to flames and fuel, but also on their ability to prepare for, respond to, and recover from a wildfire. Shortsighted and unjust policies have shaped people's abilities to cope with disasters, making some populations disproportionately vulnerable. Variables such as income, age, mobility, and other socioeconomic factors can influence vulnerability to wildfire impacts.

https://headwaterseconomics.org/natural-hazards/unequal-impacts-of-wildfire/

Wildfire risks are increasing.

Not all impacts are equal.

Tools can help understand, explore, and reduce risks.

HEADWATERS ECONOMICS

Kimiko Barrett, Ph.D.

406-224-1837

kimi@headwaterseconomics.org

https://headwaterseconomics.org | @headecon